

# The Mining Journal

## RAILWAY AND COMMERCIAL GAZETTE

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

[The Mining Journal is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.]

No. 2186.—VOL. XLVII.

London, Saturday, July 14, 1877.

WITH SUPPLEMENT. PRICE SIXPENCE. PER ANNUM, BY POST, 21s.

Mr. JAMES H. CROFTS, STOCK AND SHARE BROKER,  
AND MINING SHARE DEALER,  
No. 1, FINCH LANE, CORNHILL, LONDON, E.C.  
ESTABLISHED 1842.

BUSINESS transacted in all descriptions of MINING Stocks and Shares (British and Foreign), Consols, Banks, Bonds (Foreign and Colonial), Railways, Miscellaneous, Insurance, Assurance, Telegraph, Shipping, Canal, Gas, Water, and Dock Shares.

BUSINESS negotiated in Stocks and Shares not having a general market value.

BUSINESS in COLLIERY and IRON Shares, and in the principal WAGON and MANUFACTURING COMPANIES OF THE NORTH OF ENGLAND and SCOTLAND.

BUSINESS in all the principal COTTON SPINNING Shares.

Mr. J. H. CROFTS, having now established CORRESPONDING AGENCIES in all the CHIEF TOWNS of the United Kingdom, is prepared to deal in the various LOCAL STOCKS and SHARES at close market prices.

ACCOUNTS FOR THE FORTNIGHTLY SETTLEMENT.

A DAILY PRICE LIST, issued at 5 P.M., giving latest QUOTATIONS up to close of Market—4.30 P.M. Also, on the 1st of every month a LIST of all SECURITIES currently dealt in upon the Mining and Stock Exchanges, with latest prices, current dividends, rate of interest yielded at market price, &c.

MINES INSPECTED.

BANKERS: CITY BANK, LONDON; SOUTH CORNWALL BANK, ST. AUSTELL.

SPECIAL DEALINGS in the following, or part of:

15 Argentine, £24%. 10 East Van, 25%.  
15 Ashton, 23s. 9d. 20 Eberhardt, £25%.  
20 Aberdaunant, 12s. 6d. 25 Flagstaff, £34%.  
25 Lampyrdle, 10 Great Laxey, £21.  
25 Chicago, 23 15s. 25 Glynn, 8s.  
25 Chapel House, £23%. 20 Holmfirth, £1 10s.  
2 Clementina, 10 Huitafall.  
20 Chontales, 9s. 60 Javali, 8s.  
15 Cakemore, £23%. 15 Llanrwst, £23%.  
20 Comberton, 7s. 6d. 10 Leadhills.  
20 Condes de Chil, £34%. 20 Marke Valley, 27s. 6d.  
6 Dresby, £20. 35 North Laxey, 18s. 9d.  
25 Exchequer, 7s. 6d. 20 Pateley Bridge, 42.

\* HULTAFALL LEAD.—SPECIAL BUSINESS at close prices.

BUSINESS also on hand in—Bodidris, Belstone, Cesena Sulphur, Cedar Creek, Cargol, Denbighshire, East Craven Moor, Gorsedd and Merlin, Grogwinion, Llanbore, Last Chance, Llanigan, Minera, Medlyn Moor, New Zealand Kapanga, Oxfam Collieries, Pennant, Pandora, Port Phillip, Plymulinon, Santa Barbara, South Aurora, St. Harmon, Tecoma, Wheal Newton, Wye Valley, West Wye Valley.

\* SHARES SOLD FOR FORWARD DELIVERY (ONE, TWO, OR THREE MONTHS/ON DEPOSIT OF TWENTY PER CENT.

FOREIGN BONDS—ARGENTINE—EGYPTIAN—RUSSIAN, TURKISH, SPANISH, PERU.

RAILWAYS—HOME AND FOREIGN.

SPECIAL BUSINESS in the above, and Fortnightly Accounts opened on receipt of the usual cover.

\* THE WAR.—The latest Telegrams from the SEAT OF WAR are received throughout the day, and also the course of the Markets from EVERY CONTINENTAL BOURSE.

JAMES H. CROFTS, 1, FINCH LANE, LONDON.

AQUARIUM, HOTEL, INSURANCE, AND MISCELLANEOUS SHARES.

SPECIAL BUSINESS in Brighton Aquarium, Royal Westminster Aquarium, Yarmouth Aquarium, Crystal Palace Aquarium, Milner's Safe, Telegraph Construction, Royal Insurance, Positive Assurance, Credit Foncier, Land Mortgage Bank of India, J. P. Westhead and Co., Palmer's Shipbuilding, Newcastle Chemicals, and others.

\* BUSINESS TRANSACTED in all MISCELLANEOUS SHARES (of whatever description) having LONDON or COUNTRY MARKET VALUES.

JAMES H. CROFTS, 1, FINCH LANE, LONDON.

BRITISH LEAD SHARES.—BUSINESS in all leading Market Mines and Latest Special Information from the various districts.

JAMES H. CROFTS, 1, FINCH LANE, LONDON.

COTTON SPINNING SHARES.—BUSINESS in all OLDHAM SHARES, and in those of other DISTRICTS.

\* SPECIAL BUSINESS in the following SELECTED SHARES:—

Name of Mill. Last four dividends, per cent. Closing quotations. Buyers, Sellers.

Central ... ... ... 26, 20, 10, 10 ... £2 25% ... £2 25%  
Greencroft ... ... ... 30, 20, 5, 15 ... 3 1/2 ... 4  
Green Lane ... ... ... 30, 25, 20, 20 ... 62 1/2 ... 67 1/2  
Oldham Twist ... ... ... 26, 12, 15, 5 ... 17 1/2 ... 22 1/2  
Royton ... ... ... 30, 20, 10, 10 ... 2 ... 2 1/2  
Shaw ... ... ... 20, 18, 10, 16 ... 2 1/2 ... 2 1/2  
Star ... ... ... 25, 20, 8, 14 ... 2 1/2 ... 2 1/2  
Windsor ... ... ... 20, 10, 10, 10 ... 2 1/2 ... 3

NOTE.—The shares of good Cotton Spinning Companies pay remunerative dividends, the mills being almost entirely conducted on the Co-operative System, under the Limited Liability Acts. With a revival in trade the present rate of dividends would be augmented.

JAMES H. CROFTS, 1, FINCH LANE, LONDON.

Bankers: City Bank, London; South Cornwall Bank, St. Austell.

ESTABLISHED 1842.

Mr. WILLIAM H. BUMPUS, STOCK AND SHARE BROKER, 44, THREADNEEDLE STREET, LONDON, E.C. [Established 1867.]

SPECIAL BUSINESS, at close prices, in the SHARES of all the principal HOME and FOREIGN MINES.

Shareholders, intending investors, and others who may be desirous of obtaining information and advice as to operations at the present time are requested to communicate.

FOR SALE, at prices annexed:—

25 Argentine. 15 Flagstaff, £23%.  
40 Almada, 6s. 3d. 10 Frontino, £2 16s. 3d.  
60 Aberdaunant, 13s. 9d. 20 Gorsedd and Merlin.  
40 Ashton, 26s. 35 Glynn, 8s. 9d.  
60 Blue Tent. 25 Glenroy.  
25 Cedar Creek, 11s. 6d. 50 Hington, 8s. 9d.  
70 Chontales. 15 Huitafall.  
30 Condes de Chil. 75 I.X.L, 9s. 6d.  
40 Derwent, £2 1/2%. 40 Javali, 8s. 6d.  
10 Devon Consols. 25 Kapanga, £2 6s. 3d.  
10 Du Pedro, 9s. 6d. 20 Leadhills, £2 1s. 3d.  
10 East Van, £2 3/4%. 40 Last Chance, 15s. 6d.  
10 Exchequer, 7s. 20 Marke Valley, 27s.  
20 East Caradon, 10s. 15 New Querida, 42s.  
10 Eberhardt, £2 11s. 3d. 25 Van Consols, 7s.  
20 Aberdaunant. 30 Monydd Gorddu, 41s. 25 West Tankerville, 21s.

WILLIAM HENRY BUMPUS, SWORN BROKER. Offices: 44, Threadneedle Street, London, E.C.

Business transacted in Stock Exchange Securities and Miscellaneous shares of every description. Fortnightly accounts opened. References given and required when necessary. A Stock and Share List forwarded free on application.

BANKERS—THE NATIONAL PROVINCIAL BANK OF ENGLAND, E.C.

IMPORTANT.

THE HULTAFALL MINING COMPANY (LIMITED).

Full particulars of this valuable property, with copy of Report on same by Capt. H. Southey, of West Chiverton Mine, may be obtained on application to Mr. W. BUMPUS, who has Special Business in the Shares.

All who have money to invest should secure an interest in this company at once.

44, Threadneedle Street, London, E.C.

MESSRS. PETER WATSON AND CO., 54 OLD BROAD STREET, LONDON, E.C. BUSINESS in STOCKS and SHARES.  
RAILWAYS, BANKS, DIVIDEND LEAD MINES, &c. BANKERS: THE ALLIANCE BANK (Limited). A CIRCULAR published MONTHLY. Single Copy, 6d.; Annually, 5s.

Mr. ALFRED E. COOKE, 76, OLD BROAD STREET, LONDON, E.C. STOCK AND SHARE DEALER, ESTABLISHED 1853.

Business transacted at NET PRICES in CONSOLS, ENGLISH RAILWAYS, BANKS, FOREIGN STOCKS, TELEGRAPHS, & MISCELLANEOUS SHARES.

SPECULATIVE ACCOUNTS opened on receipt of cover in RAILWAYS and FOREIGN STOCKS. PURCHASERS of MINING SHARES should apply to Mr. COOKE, who can always supply at LOWEST PRICE NET. CLOSING PRICES OF RAILWAYS, FOREIGN STOCKS, and MINES, corrected to 5 45 P.M., ready DAILY.

JULY "SPECIAL INVESTMENT CIRCULAR" is NOW READY. Application should be made at once, post free.

EVERY FRIDAY EVENING IS PUBLISHED, in time for Evening Post, THE INVESTOR'S GAZETTE, containing latest prices and advices from Mines, with other valuable intelligence for investors.

TERMS OF SUBSCRIPTION—12 MONTHS, 10s.; 6 MONTHS, 5s.; 3 MONTHS, 2s. 6d. ALFRED E. COOKE, 76, OLD BROAD STREET, LONDON. ESTABLISHED 1853.

Mr. JAMES STOCKER, STOCK AND SHARE BROKER, 2, CROWN COURT, THREADNEEDLE STREET, LONDON, E.C. [Established 1848.]

BUSINESS transacted in all kinds of STOCK EXCHANGE SECURITIES also in every description of BRITISH and FOREIGN MINING, COLLIERY MANUFACTURING, and other SHARES.

SPECIAL BUSINESS in the following:—

Aberdaunant, 12s. 6d. Huitafall. Parys Mountain, 11s. 6d. Rookhope, 21s.  
Aberdunant, 23s. 9d. Ladywell, 20s. Roman Grav., £9%.  
Chapel House, £23%. Ladywell, 20s. So. Roman Gravels, 11s.  
Comberton, 7s. Llanrwst, 48s. Tankerville, £7 1/2%.  
Derwent, £2 1/2%. Mynydd Gorddu. Thorp's Gawber, £3 1/2%.  
Devon Consols, £4 1/2%. North Laxey, 18s. 6d. Van Consols, 9s.  
East Van, £5 1/2%. Plymulinon, 6s. West Tankerville, 19s.  
Grogwinion, £20%. Pennerley, 2s. 6d. West Chiverton, £15 1/2%.  
Great Laxey, £20%. Pateley Bridge, 3s. Wheal Grenville, £1 1/2%.  
Glenroy, 21s. Pennerley, 2s. 6d. West Wye Valley, 21s.  
Glyn, 7s. 3d. Pandora. New Querida, 37s. 6d. United Mexican.  
Argentine, £4 1/2%. Flagstaff, £3 3s. 9d. Port Phillip, 1s. 6d.  
Cedar Creek, 9s. Frontino, £2 1/2%. Richmond, £6 1/2%.  
Combes of Chil. I.X.L, 8s. 9d. San Pedro, £2 1/2%.  
Chicago, 48s. Javali, 8s. 9d. South Aurora, 4s. 6d.  
Chontales, 7s. 6d. Last Chance, 15s. 3d. Tecoma, 7s. 6d.  
Don Pedro, 10s. 6d. Eberhardt, £2 1/2%. United Mexican.

JAMES STOCKER, SWORN BROKER.

CONSOLS, FOREIGN BONDS, RAILWAYS, BANK, TELEGRAPH, GAS, and all MISCELLANEOUS SHARES bought and sold, and fortnightly accounts opened for same. Shares sold for forward delivery on receipt of cover. List of prices and every information forwarded on application. References given and required when necessary.

BANKERS: LONDON AND WESTMINSTER.

Mr. T. E. W. THOMAS, SHARE BROKER, 3, GREAT WINCHESTER STREET BUILDINGS, E.C. ESTABLISHED 1857.

The following are the latest prices at which business could be done. Where the difference between the buying and selling price is wide transactions may be effected at an intermediate price:—

Buyers, Sellers.	Buyers, Sellers.
Aberdaunant ... 13s. ... 15s.	North Laxey ... 17s. 6d. ... 20s.
Argentine ... £4 4 ... £4 1/2	New Querida ... £1 1/2 ... £2
Ashton ... 34 ... 1	New Zealand Kapanga ... 2 ... 2 1/2
Bodidris ... 1 ... 1 1/2	Parys Mountain ... 10s. ... 12s. 6d.
Derwent ... 2 ... 2 1/2	Pateley Bridge ... 1 1/2 ... 1 1/2
Devon Great Consols ... 4 1/2 ... 4 1/2	Pennerley ... 2s. 6d. ... 5s.
Dolcoath ... 28 ... 30	Pateley Bridge ... 1 1/2 ... 1 1/2
Don Pedro ... 9s. ... 11s.	Pennyrely ... 2s. 6d. ... 5s.
Eberhardt ... 6 1/2 ... 7	Pennyrely ... 2s. 6d. ... 5s.
East Caradon ... 14s. ... 16s.	Pennyrely ... 2s. 6d. ... 5s.
East Van ... 6 ... 5 1/2	Pennyrely ... 2s. 6d. ... 5s.
Exchequer Gold ... 6s. ... 8s.	South Condurrow ... 7 1/2 ... 8
Flagstaff ... 3 ... 3 1/2	Tankerville ... 7 1/2 ... 7 1/2
Glenroy ... 7s. 6d. ... 10s.	Tincoff ... 12 ... 14
Glyn ... 7s. 6d. ... 10s.	Tincoff ... 12 ... 14
Great Laxey ... 20 ... 21	Van Consols ... 8s. ... 10s.
Javali ... 7s. ... 9s.	West Ashton ... 5s. ... 7 1/2
Last Chance ... 12s. 6d. ... 15s.	West Ashton ... 5s. ... 7 1/2
Ladylwell ... 7s. ... 8 1/2	West Chiverton ... 14 ... 16
Leadhills ... 6 ... 6 1/2	West Chiverton ... 14 ... 16
Marke Valley ... 1 ... 1 1/2	W. Grenville (call pd.) ... 1 1/2 ... 2

SPECIAL BUSINESS in Aberdaunant, Llanrwst, Rookhope, North Laxey, and Gorseid and Merlin. The latter mine is now extraordinarily rich in lead ore. The sales, already 50 tons per month, are about to be materially increased. Holders will have immediate and good dividends.

MESSRS. GREGORY, WHITAKER, AND CO., STOCK AND SHARE DEALERS, 81, BISHOPSGATE STREET WITHIN, LONDON.

BEG to notify to their clients and investors generally that Shares offered in the LLANRWST LEAD MINE at low prices, through the medium of this Journal, are rarely, if ever, delivered to the Buyer. To ensure the delivery of Shares bought, purchasers are cautioned to pay cash only on the delivery of transfers, accompanied by the holders' certificates.

MESSRS. HARLAND AND CO., STOCK AND SHARE DEALERS, 28, GREAT ST. HELEN'S, BISHOPSGATE STREET WITHIN, LONDON, E.C.

Business transacted in every description of British and Foreign Stocks, Mining Shares, &c. Fortnightly accounts opened upon receipt of usual cover.

The following Shares are strongly recommended for a rise of 50 to 100 per cent, upon present price:—Court Grange (Lead), North Laxey, Javali, and Rookhope. Bankers: The Alliance Bank (Limited).

Mr. THOMAS THOMPSON, JUN., STOCK AND SHARE DEALER, AND MINING AGENT AND ACCOUNTANT, 1, PALMERSTON BUILDINGS, BISHOPSGATE STREET, LONDON, E.C.

Mr. W. MARLBOROUGH, STOCK AND SHARE DEALER, 29, BISHOPSGATE STREET, LONDON, E.C. (Established 20 Years, can sell the following SHARES, at prices annexed:—

50 Aberdaunant.	40 Flagstaff, £2 4s.	50 Parys Mount, 12s. 1/2.	50 PERKIN'S BEACH ... LEAD.
100 Almada, 5s.	10 Fortuna, 25 11s. 3d.	100 PANDORA ... do	100 PENNANT ... do
20 Altam, £5.	20 Gorsedd & Merlin.	100 PENNERLEY ... do	100 ROKHOPE ... do
60 Bodidris, £1 2s. 6d.	50 Glyn, 8s. 9d.	100 GLENROY ... do	25 ROMAN GRAVELS ... do
35 Colorado Ter., £1 16s.	100 Great W. Van, 4s.	20 GREAT DYLIFFE ... do	50 RED ROCK ... do
25 Chicago, £2 3s. 9d.	100 Last Chance, 17s.	100 GREAT LAXEY ... do	15 ST. HARMON ... do
20 Cakemore, £2 1/2%.	20 Leadhills, £6 1s. 3d.	50 SOUTH CONDURROW ... TIN.	50 TALYBONT ... LEAD.
50 Comberton, 6s. 9d.	30 Malabar, 6s. 6d.	25 TANKERVILLE ... do	25 TANKERVILLE ... do
100 Chontales, 8s. 3d.	40 Malpas, 10s.	60 VAN CONSOLS ... do	60 VAN CONSOLS ... do
20 Devonport and Tiverton Brewery, £4 1/2%.	30 Nth. Laxey, 19s. 6d.	50 WEST TANKERVILLE ... do	50 WEST TANKERVILLE ... do
80 Don Pedro, 10s. 6d.	40 Pennerley, 4s.	30 TOLIMA ... do	30 TOLIMA ... do
50 East Caradon, 9s. 3d.	50 Parys Mountain, 12s. 1/2.	50 WEST GOGINAN ... do	50 WEST GOGINAN ... do
10 Eberhardt, £2 11s. 3d.	50 Pennerley, 4s.	20 WEST CRAVEN MOOR ... do	20 WEST CRAVEN MOOR ... do
20 Aberdaunant.	50 Parys Mountain, 12s. 1/2.	100 PENSTRUTHAL ... TIN.	100 PENSTRUTHAL ... TIN.
20 Aberdaunant			

# HALF-YEARLY BRITISH MINING SHARE LIST, JANUARY TO JUNE, 1877.

SHOWING THE PRICES OF THE LONDON MARKET ON THE 1ST JANUARY, AND THE 30TH JUNE, 1877, AND THE LOWEST AND HIGHEST PRICE FOR THE SIX MONTHS JANUARY TO JUNE INCLUSIVE.

CONTRIBUTED BY Mr. EDWARD ASHMEAD, LONDON MINING AGENT AND ACCOUNTANT, 62, CORNHILL, LONDON, E.C.

THE FOLLOWING LIST EMBRACES THOSE MINES IN WHICH DURING THE PAST SIX MONTHS THERE HAVE BEEN FREQUENT DEALINGS AND CONSTANT QUOTATIONS, AND NOT THOSE IN WHICH THERE HAVE BEEN BUT FEW TRANSACTIONS AT LONG INTERVALS. IT MAY BE OBSERVED THAT SOME MINES ARE NOT INCLUDED, ARISING FROM THEIR SHARES BEING FIRMLY HELD, AND NO DEALINGS OR PRICES REPORTED. MINING SHARES HAVING THEIR TRANSACTIONS EXCLUSIVELY IN PROVINCIAL MARKETS WILL NOT BE FOUND IN THIS LIST.

MINE AND COUNTRY.	Mineral.	Shares.	Paid.	Price, Jan. 1, 1877.	January.		February.		March.		April.		May.		June.		Price, June 30, 1877.
					Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	
CORNWALL—WEST.																	
Agar, Wheal	Copper	6,000	11 10 0	2½ to 3	2½	4	3	3½	3½	3	3½	3½	4	3	3½	3½	3 to 3½
Basset, West	Copper	6,000	5 13 4	4 4½	4	5	3½	5	3	4½	3	4	1	2	2½	2½	—
Basset, Wheal	Copper	512	19 2 6	12½ 17½	7½	17½	7½	12½	7½	12½	7½	12½	7½	12½	7½	12½	12½
Cargoli	Lead	3,348	6 6 0	4½ 5½	4½	5	7	7½	6	5	5½	5	4	3½	3½	4	4
Carn Brea	Tin and copper	1,000	36 7 6	37½ 40	35	40	35	37½	34	37½	32	36	34	37	30	36	30 32
Carn Brea, South	Tin and copper	5,000	3 5 0	3½ 3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½
Cathedral	Tin and copper	15,000	1 10 0	1 1½	1	1½	1	1½	1	1½	1	1½	1	1½	1	—	—
Chiverton, West*	Lead and blende	3,000	12 10 0	18 19	18	19½	18	19½	17½	19	16	17½	15	17	14	17	—
Coates, Wheal	Tin	6,000	2 0 0	1½ 2	1½	2	2	1½	2	1½	2	1½	2	1½	2	1½	2
Condurrow, South*	Tin and copper	6,123	6 5 6	6½ 7½	6	7½	5½	6½	6	6½	7½	7	9	8½	7½	7½	7½
Cook's Kitchen	Tin	2,450	23 9 9	4½ 5	4	5	5	2½	4	3½	2	3½	2	3	1	3	7½
Crofty, South Wheal	Copper	937	37 0 10	13 15	13	16	16	18	12	16	12	15	10	15	11	10	11
Dolcoath*	Tin, cop., arsen.	4,296	10 10 8	39 41	35	41	35	37½	34	37½	32	36	35	35	34	34	30
Frances, South Wheal	Copper	4,500	7 12 4	8 9	8	9	8	9	8	9	8	9	8	9	8	9	9
Frances, West Wheal	Tin	2,048	28 1 3	5½ 6	4½	6	6	3½	5	4	5	3½	4½	2	3	2	3
Godolphin, West	Tin	5,000	2 6 0	2½ 3½	2½	3½	3½	2½	3½	3	2½	3	2	3	2	3	3
Grenville, Wheal	Copper and tin.	5,179	12 18 6	22s. 24s.	22s.	24s.	1	1½	1	1½	1	1½	1	1½	1	1½	1½
Hendra, New	Tin	1,492	3 9 0	22s. 24s.	22s.	24s.	1	1½	1	1½	1	1½	1	1½	1	1½	1½
Kitty, Wheal (St. Agnes)	Tin	4,295	5 4 6	3½ 3½	3½	3	3½	2½	3	2	3	2	2½	2	2½	2	3
Peevor, Wheal	Tin	3,000	6 10 0	3	3½	2½	3½	2½	3½	2½	3½	2½	3	2	2½	2	3
Penstrith...	Tin and copper	45,793	2 0 0	10½	10½	17s. 6d.	11s.	17s. 6d.	10s.	13s.	9½	12s. 6d.	7s. 6d.	12s. 6d.	4s.	10s.	4s.
Pool, East*	Tin and copper	6,400	0 9 9	11½ 12½	11	12	10½	11½	10	11	9½	11	9	10	9	9	9
Provident	Tin	1,120	21 6 7	1½ 2½	1½	2½	2½	2½	2½	2½	2½	2½	3	4	3	4	3
Reliation Consols	Copper	6,000	0 10 0	1	1½	1	1½	1	1½	1	1½	1	1½	1	1½	1	1½
Seton, West Wheal	Copper	600	47 0 0	32½ 35	25	34	27½	35	27½	35	30	35	30	32½	28	32½	30
Tincroft*	Tin and copper	6,000	9 0 0	20	22	19½	21	19	20	18	21	16	19	16	18	14	15
Tolgas Consols	Copper	10,000	5 0 0	—	—	—	—	—	—	—	—	5	5	5	5	5	5
Tolgas, West Wheal*	Copper	512	95 10 0	62 64	60	64	59	63	59	62½	59	62½	58	62	60	62	60
Uny, Wheal	Tin	4,096	13 11 6	2½ 2½	2	2½	1½	2	1½	2	1½	1½	1½	1	1	1	1½
CORNWALL—EAST.																	
Caradon, East	Copper	6,144	2 14 6	1½ 1½	1	1½	1	1½	1	1½	1	1½	1	1½	1	1½	1½
Caradon, Glasgow*	Copper	40,000	1 0 0	1½ 1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½
Caradon, South*	Copper	512	1 5 0	110 130	110	130	110	130	110	130	110	130	110	130	110	130	110 130
Gunnislake (Clitters)*	Copper	9,830	2 2 0	2½ 2½	2	2½	2	2½	2	2½	2	2½	2	2½	2	2½	2
Herodsfoot	Lead	1,024	8 10 0	3 4	2½	4	2½	4	2½	4	2½	4	3	4	3	4	3
Hingston Down	Copper	18,000	1 0 0	1½ 1½	1	1½	1	1½	1	1½	1	1½	1	1½	1	1½	1
Mark Valley	Copper	9,000	4 6 0	1½ 1½	1	1½	1	1½	1	1½	1	1½	1	1½	1	1½	1
Prince of Wales	Copper	12,800	2 2 0	3s. 5s.	1½	3s.	6s.	2s. 6d.	7s. 6d.	2s. 6d.	7s. 6d.	1s. 6d.	4s.	2s.	3s.	2s.	3s.
Trebeigh Consols	Lead	12,000	0 9 0	6s. 6d. 7s. 6d	4	7s. 6d.	4	7s. 6d.	7s. 6d.	7s. 6d.	10s.	7s. 6d.	10s.	7s. 6d.	10s.	7s. 6d. 10s.	
DEVON.																	
Bedford United	Copper	12,000	1 19 6	8 9	8	9	8	9	8	9	8	9	8	9	8	9	8
Combmarin	Lead	6,000	0 6 0	—	—	—	—	—	—	—	—	—	—	—	7s. 6d.	15s.	7s. 6d. 10s.
Crebior, Wheal	Copper	6,000	4 1 0	2½ 3½	2½	3½	3½	2½	3½	3½	2½	3½	2	2½	2	2½	2
Devon Great Consols*	Cop., arsen., &c.	10,240	1 0 0	4½ 5	4	5	5	4	5	4	5	4	5	4	4	4	4
Gawton	Copper	3,950	4 3 6	3 3	3	3	3	3	3	3	3	3	3	3	3	3	3
DURHAM.																	
Rookhope	Lead	15,000	1 10 0	2 1	1	1	1½	18s.	21s.	16s.	20s.	17s. 6d.	21s.	18s.	1½	1	1½
VORKSHIRE.																	
Craven Moor, East	Lead	3,000	10 0 0	—	—	—	—	—	—	—	—	—	10	10½	10	10½	10
Craven Moor, West	Lead	3,000	10 0 0	12½ 13½	12½	13½	12½	13½	12½	13½	12	13	11	13	11	13	11
Pateley Bridge	Lead	4,000	5 0 0	2½ 3	2	3	3	2½	3	2½	3	2	3	2	2½	2	2½
Pateley Bridge, West	Lead	4,000	5 0 0	—	—	5	5½	5	5½	—	—	—					

## Lectures on Practical Mining in Germany.

CLAUSTHAL MINING SCHOOL NOTES—No. XXXIII.\*

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## SECTION II.

## PROSPECTING FOR MINERALS—BORING.

## III.—THE BORING OPERATION.

At the salt mine Luisenthal, near Göttingen, a bore hole has been put down to a depth of 1200 ft. with the use of a rope. The motive power was obtained from a 10-horse power portable engine, and by means of belts and gearing could be applied for boring, sludging, &c. The drum round which the rope is coiled is provided with a hand brake. Over the mouth of the bore shaft a four-legged frame is placed, and straddled against the bore tower. On the top of the frame a pulley is fixed, which is driven from the engine by means of a belt. On the same axle a small spur wheel is fixed, which turns into a larger wheel, on a second axle, placed over the centre line of the bore shaft. On this second axle a disc is keyed, which has a moveable crank pin. Lower down, and attached to the frame by means of two cross bearers, are two slide bars, between which a cross head slides up and down. The cross head is attached by means of a connecting rod to the moveable crank pin in the disc. To a short rod from the cross head the lengthening screw is attached, and to and below this wooden clamps for holding the rope are fixed. The wooden clamps serve the purpose of holding the rope as it is paid out from the rope drum, which is done every time the rope has been lowered so far as possible by the lengthening screw. By making the crank pin moveable in the disc the lift of the tool can be altered at pleasure to suit the varying nature of the rock passed through.

The boring tool is of cast-steel, the blade being 1 in. thick, with cutters on the periphery 4 in. wide. The shaft fits into the lower end of the boring rod with a conical joint, where it is also cottered. The boring rod, which is 20 ft. long, and weighs nearly 7 cwt., carries at about one-third of its length from the upper end a cap, on which rests an india rubber ring. The upper part of the rod is turned, and the guides to preserve it in a vertical direction slide on this portion, and rests also on the india rubber ring, which is to deaden the shocks to which the guides are constantly subjected. Near to the extreme upper end of the rod a hollow cylinder is attached with a cotter, and over this an india rubber ring is passed. The swivel to which the rope is attached is next passed over the end of the boring rod, which is screwed, and a nut is screwed on to the end of the rod, and to prevent its working loose a split pin is passed through the nut and rod. As under certain circumstances it becomes advisable to alter the pressure between the swivel and the india rubber ring, and as the nut (owing to the split pin passing through it and the rod) cannot be screwed down or up for this purpose, a steel washer is inserted between the nut and swivel, and between the washer and the swivel a second india rubber ring is also inserted. The pressure is altered by using washers of varying thickness. The rope, which is an iron wire rope, is 1 in. diameter, and consists of six strands (twisted to the right), each strand consisting of seven wires, 3 millimetres in diameter.

The rope used for sludging is  $\frac{1}{2}$  in. wire-rope, and is coiled round a special drum. In commencing the boring operations the borer and rope are lowered into the bore hole by means of the brake on the winding drum, which can be put into and out of gear with the engine. When the borer has reached the bottom of the bore hole, and the lengthening screw is screwed up to its shortest length, and the cross head in its lowest position, the rope is then passed through the wooden clamp, which is tightened by four bolts and nuts, and the rope is further unclosed from the drum, so as to leave sufficient slack for the up and down motion of the rope by means of the lengthening screw. After these details have been carried out the rope is lowered a little by means of a lengthening screw, so that the boring tool can strike the bottom with its whole weight. Every time the tool strikes the bottom of the bore hole the strain (due to the weight of the borer) is suddenly taken off the rope, and in consequence of the elasticity of the wires the rope tends to coil itself during the time that it is released from the weight of the rods, when the rope ascends, and again receives the weight of the borer, it tends to untwist. This gives rise to a reciprocating partial rotation of the swivel, first in one direction and then in the other. At the moment when the borer strikes the bottom of the bore hole, and the rope coils itself, the swivel, owing to the slight pressure with which it is held between the two india rubber washers, can rotate slightly with the rope without the borer (which rests on the bottom of the bore hole) towards the right. When the rope ascends and raises the borer, its weight causes a tendency in the wires to straighten themselves, thus untwisting the rope—i.e., rotating it slightly towards the left—and the weight of the borer occasions such a pressure between the swivel and the nut on the end of the borer that the friction, which is increased by the india rubber washer, causes the borer to partake of this motion to the left; hence after every blow the boring tool is rotated slightly towards the left. The india rubber washer, immediately beneath the swivel, is intended to regulate the amount of rotation of the borer. When the tool strikes the bottom of the bore hole, this india rubber washer prevents the whole of the pressure on the swivel being taken off, so that the rotation of the swivel to the right is prevented from taking place to the full extent that the coiling of the rope would cause were the swivel perfectly loose. All this is regulated by varying the thickness of the washers, and must be first ascertained by a few trials. The height of the lift amounts to about 2 ft., and 35 to 40 blows per minute is the extreme limit.\*

The connection of the sludger with the rope is worthy of being specially noticed. Besides the ordinary swivel joint, which allows of rotation round a vertical line, there are two ordinary pin joints, with the pins at right angles to each other: this connection allows of a motion in any direction, and consequently tends greatly to preserve the rope where it is capped.

Herr Hochstrate, of the Rheinpreussen Colliery, has devised the following free falling rope borer, which, like Fabrian's instrument, consists essentially of two parts—a hollow (bored) cylinder, and a free falling piece (with two wings), which slides within the cylinder. In the cylinder are two long slits, placed diametrically opposite, and in these the wings of the free falling piece slide. The lower end of the free falling piece (which slides within the cylinder, and which is somewhat longer than the cylinder) is welded to a broad screw (which has been formed by twisting a long thick flat piece of iron), and this latter is cottered at its lower end, where it is turned cylindrical to a long heavy rod of iron, which is attached to give sufficient striking weight; and, lastly, a similar cottered joint connects this rod to the cutting tool. The upper end of the hollow cylinder is connected in a similar manner by a cottered joint, with a second broad screw, formed in the same manner as the first; the upper end of the screw terminates in a short round rod, to which the swivel is attached, the latter being connected directly with the flat hemp rope. Both screw blades have the same pitch, but the upper one is twisted from left to right, and makes one complete turn, the lower is twisted from right to left, and makes a turn and a half. Just above the cylinder, at the lower straight portion of the upper screw blade two semicircular lids, or halves, of a cap are hinged, and to the under side of each a leather strap is attached, which passes downwards to each of two short levers. Each lever is hinged between a steel plate, which is screwed on to the cylinder (near the upper end of each slit) and the cylinder itself. The caps on which the levers are hinged pass each through one of steel plates and screw into the cylinder. Where the levers are

\* Being Notes on a Course of Lectures on Mining, delivered by Herr Bergstrat, Dr. Vor Groddeck, Director of the Royal Bergakademie, Clausthal, the Harz, North Germany.

† This number might, perhaps, be somewhat increased if the disc to which the swivel pin is attached were arranged on the principle of a quick down stroke. In this case attention should be paid to the proper balancing of the disc, &c.

attached to the pins they are rounded off eccentrically, in such a manner that when the lever ends are raised the rounded portion of the levers project half way into the slit; but when the levers fall, in consequence of the eccentricity of the lever where it is hinged on the pin, the lever does not project into the slit. Where the steel plates are attached the slits are enlarged to double their width, a flat ledge being filed on each of the steel plates, broad enough for the wings to rest upon. The side of each slit just above the ledge, or rather at a little more than the height of the wings above the ledge, is inclined, gradually narrowing the slit at the upper end to nearly the same width as the thickness of the wings. The steel plates, which are the most subject to wear at the ledges, can be unscrewed, and replaced or repaired. During the raising of the apparatus the wings rest upon the ledges, and consequently the free falling piece and borer are also raised, and during this time the pressure of the water above the cap keeps the two halves hung downwards, and allows the short levers to fall, which in this position do not project into the slit. The pressure of the water on the screw blades tends to turn the upper blade and the cylinder towards the left, and the lower blade and free falling piece with the wings towards the right, and thus preventing the wings from slipping off the ledges, and the consequent inopportune falling of the borer. In consequence of the opposite tendency of the two screw blades, and the friction of the swivel joint, the apparatus is raised without rotation, when the borer has attained its highest position, and commences to descend, the pressure of the water beneath the screw blades tends to turn the upper screw and the cylinder to the right, and the lower screw blade and the falling piece to the left, which tends to throw the wings off their seats, the pressure of the water beneath the two hinged lids, or semicircular caps, raises them and the leather straps with the short levers, and the projecting part of the levers presses against the wings; the combined effect of all these suffices to throw the wings off their seats. It has been found in experience that with a free falling weight of 5 cwt., the effects of the screw blades was not sufficient to throw the wings off their seats.

During the free descent of the free falling piece the pressure of the water beneath the lower screw blade turns the free falling piece to the left, as far as the width of the long vertical slit will allow. In consequence of the much greater velocity with which the free falling piece falls than that with which the rope and the cylinder descend, the resistance of the water against the lower screw blade is greater than that against the upper blade, so that the tendency of the descent of the whole apparatus is to cause the rotation of the free falling piece to be greater than that allowed by the slit. It is found in practice, however, that the inertia of the cylinder is sufficient to prevent it being turned with the cutter. As the cylinder descends still further the wings glide (relatively so) along the left side of the long vertical slit; where, however, the left side becomes inclined (as the borer is so firmly fixed in the cut caused by the blow that it, and consequently the wings, cannot rotate), the cylinder is caused to rotate slightly towards the left, and this rotation is assisted by the pressure of the water on the top of the upper screw blade immediately the rope begins to ascend; in consequence of which the wings are brought vertically over their seats, and are caught by these on the further rise of the apparatus, raising the free falling piece with it.

It will be evident that the angle through which the free falling piece is rotated depends on the width of the long vertical slit. As it is sometimes necessary to alter the number of blows for each complete rotation of the cutting tool, to suit the varying nature of the strata passed through, &c. The width of the slit is varied by screwing long side pieces, of suitable breadth, on to the cylinder close to the slit. It will also be evident that the regular rotation of the cutting tool renders the use of a flat rope indispensable.

In our next lecture we shall commence the consideration of "rotatory boring."

## ROYAL SCHOOL OF MINES.

The following is the list of Associates for the present year:—  
Associates in Mining and Metallurgy—Folkard, C. W.; Huntington, A. K.; Voelcker, E. W.  
Associates in Mining—Liveing, E. H.; Merritt, W. H.  
Associates in Metallurgy—Copeland, A. C.; Hogan, J. F.; Lemann, C. H.; Leyson, W.; McCarthy, E. T.  
Associate in Geology—Sawyer, A. R.  
The Edward Forbes Medal and Prize of Books was awarded to A. Heilprin.  
The De la Beche Medal and Prize of Books to E. W. Voelcker.  
The Murchison Medal and Prize of Books to F. G. Mills.

## GEOLOGICAL SOCIETY OF LONDON.

June 20—Prof. P. MARTIN DUNCAN, M.B., F.R.S. (President), in the chair.  
George Alexander Gibson, M.B., D.Sc., Lauder-road, Grange, Edinburgh; Henry P. Gurney, M.A., clerk, Fellow of Clare College, Cambridge; John Higson, mining engineer, Albert-square, Manchester; and Francis Stevenson, M.I.C.E., chief assistant engineer, London and North-Western Railway, Euston Station, N.W., were elected Fellows of the Society.—Oswald Fitch, Highbury New Park; John Hadkinson, Brunswick-street, Liverpool; B. Holgate, engineer, Atkinson-street, Hunslet, Leeds; H. F. Parsons, M.D., Goole, Yorkshire; and Edgar P. Rathbone, Duke of Norfolk's Nunnery Colliery Offices, Sheffield, were proposed as Fellows of the Society.—Stephenson Clarke, Croydon Lodge, Croydon, Surrey; William Hunter, Sandhoe, near Hexham; and the Rev. W. Roberts, St. Leonard's-terrace, Cheshire, will be balloted for as Fellows of the Society.

The following communications were read:—

1.—"On an hitherto Unnoticed Circumstance affecting the Piling Up of Volcanic Cones." By R. Mallet, F.R.S., F.G.S.

2.—"The Steppes of Southern Russia." By T. Belt, F.G.S.

3.—"The Glacial Period." By J. F. Campbell, F.G.S.

In this paper the author gave the results of numerous observations extending over many years, and made in many different parts of the world, the results of which had led him to form the opinion that no geological record exists of any abnormal Glacial periods colder than the present world's climate. But if the term "Glacial period" be used with a limitation such as "local," or "Alpine," or "European," he saw nothing to object to. Changes in the relations between the surface of the earth and the undoubtedly permanently glacial portions of the atmosphere, principally brought about by changes of level in the former, appeared to him sufficient to account for the phenomena. The most recent so-called Glacial periods being fixed in Post-Pliocene times, the author remarked that Indian glaciers (lat.  $27^{\circ}$ — $32^{\circ}$  N.) are now almost as large as they have been since the deposition of the crumpled Tertiary deposits known as "Nuhans" and "Sivaliks." A similar result was obtained from observations in the Caucasus (lat.  $40^{\circ}$ ) and Rocky Mountains (lat.  $30^{\circ}$ — $37^{\circ}$  N.). In Northern Italy (about lat.  $45^{\circ}$ — $46^{\circ}$  N.) glaciers were a great deal larger in Post-Pliocene times than at present.

4.—"The Action of Coast Ice on an Oscillating Area." By Prof. J. Milne, F.R.S., of the Imperial College of Engineering, Tokio, Japan.

5.—"On Points of Similarity between Zeolitic and Siliceous Inclusions of recent formation by Thermal Springs, and those observed in Amygdaloid and other altered Volcanic Rocks." By Prof. A. Daubrée, F.M.G.S.

6.—"On the Cretaceous Dentalia." By J. S. Gardner, F.G.S.

7.—"On a number of New Sections around the Estuary of the Dee which exhibit Phenomena having an important bearing on the Origin of Boulder Clay and the Sequence of Glacial Events." By D. Mackintosh, F.G.S.

8.—"Discovery of Silurian Beds in Teesdale." By W. Gunn, F.G.S., and C. T. Clough, B.A., F.G.S., of H.M. Geological Survey.

9.—"On the Superficial Geology of British Columbia." By G. M. Dawson, F.G.S., Assoc. R.S.M., of the Geological Survey of Canada.

10.—"The Exploration of the Ossiferous Deposit at Windy Knoll, Castleton, Derbyshire." By Cooke Pennington, LL.B., F.G.S., and Prof. W. Boyd Dawkins, M.A., F.R.S., F.G.S.: by the latter.

11.—"Description of the Fossil Organic Remains from Bendigo." By M. Carl August Zachariae: communicated by the President.

12.—"Notes on some recent Discoveries of Copper Ore in Nova Scotia." By Edwin Gilpin, M.A., F.G.S.

The author described the occurrence in the northern part of Nova Scotia of a great band of Silurian deposits, running nearly east and west, and traversed in a corresponding direction by numerous detached bands of granites, syenites, &c. Roughly parallel to the line of the latter there is a tolerably well-defined series of fractures running from Parrsboro, on the Bay of Fundy, to Guysboro, on the Atlantic Coast. The course of this line of disturbance is marked by metamorphism, and by the presence of associated ores of iron and copper. The principal localities where the latter occur are noticed by the author, who states that the copper deposits attain their greatest development near Lochaber Lake and Polson's Lake, where they form a series of veins cutting at oblique angles black and red shales and quartzites, apparently of somewhat doubtful age. The quality of the ore is said to be good.

13.—"Glacial Drift in the North-Eastern Carpathians." By R. L. Jack, F.G.S., and J. Horne, F.G.S., of the Geological Survey of Scotland.

14.—"On Terminal Curvature in the South-Western Counties." By W. A. E. Usher, F.G.S., of H.M. Geological Survey.

15.—"On the Chronological Classification of the Granitic Rocks of Ireland." By G. H. Kinahan, M.R.I.A.: communicated by Professor Ramsay, F.R.S., F.G.S.

16.—"The Cambrian Rocks of South-East Ireland." By G. H. Kinahan, M.R.I.A.: communicated by Prof. Ramsay, F.R.S., F.G.S.  
The next meeting of the society will be held on Wednesday, Nov. 7.

## BRISTOL MINING SCHOOL.

Two out of the five doctorates awarded this year by the London University have fallen to old scholars of this school.

Dr. Walter Saise has graduated in Geology and Palaeontology. He took a Royal Exhibition at the Mining School, and the Associateship of the Royal School of Mines in all three departments.

Dr. Herbert Munro also took a Royal Exhibition at the Mining School, the Associateship of the Royal College of Science, and the Chemical Scholarship of the London University in graduating as Bachelor of Science.

This Scholarship has again fallen to an old scholar of the Mining School in the person of Mr. Ernest Cook.

## IMPROVED GAS FURNACES.

At a recent meeting of the Society of Engineers, at Liège, an interesting paper descriptive of Bicheroux's Gas Furnace system was read by Mr. Raze, the general manager of the Ougrée Iron Company, near that place, and as Mr. C. Holste, of Great St. Helen's, is now introducing it into this country, a short account of it may not be uninteresting. All the heating and puddling furnaces at Ougrée are now worked by gas on Bicheroux's system. Formerly there were 27 ordinary single puddling-furnaces, which have been supplanted for the same production by 15 gas furnaces, each with two working doors. The 27 ordinary furnaces required 108 men for day and night service, 54 being master puddlers. The 15 gas furnaces now only require 90 men, of which 30 are master puddlers. The work at the gas furnaces is much lighter than at ordinary furnaces. The saving of coal at Ougrée since the general adoption of the gas furnaces amounts to 30 tons per day, and the coal used now is of an inferior kind, therefore cheaper. There is a plentiful supply of steam, though there are fewer puddling furnaces. No other boilers are used than those attached to the heating and puddling furnaces.

The apparatus consists of three distinct parts—a gas producer, where only a small quantity of air is admitted through the grate for the production of carbonic oxide; a mixing chamber, where this gas and air is collected by the natural draught, and where the combustion of the gas begins; and a furnace or laboratory, where the combustion is nearly completed, and where the different reactions in the puddling process take place. The dimensions of each of these three parts vary with the composition of the different coals, and the system can be applied to all kinds of coal, even to such which, from being small and slatey, are not suitable for ordinary puddling. The gases and air necessary for their combustion being brought together at different temperatures, and having to be drawn into the mixing and combustion chamber by the same chimney, it is easily understood that the dimensions of their conduits must vary with each kind of coal, and that the manner of bringing them together is not unimportant. Before the air arrives at the intermediate chamber it is allowed to circulate beneath the bottom of the furnace, and in the sides of the chamber itself, in such a way that the advantages of heating the air, as well as of cooling such parts of the furnace which cannot be heated without injury, are obtained. The gases which leave the furnace not completely burnt are utilised for the heating of the boilers as in ordinary furnaces. The management of the fire is very easy, waste is diminished, and there is a working door on each side.

With regard to the economy in coal, Mr. Raze states that with the ordinary furnaces the puddling of ordinary white Ougrée iron required 18 to 20 cwt., whilst it is now done with 12 cwt., per ton of puddled bars produced. The puddling of fine-grained iron, which required 26 to 30 cwt., is now done with 16 cwt. Such is the advantage with regard to the quantity of coal. As to the quality, this gas furnace system presents also a very marked advantage, as it does not require large coal (charbon roulant). The working is just as regular with small coal even when screened through meshes of 20 millimetres ( $\frac{3}{4}$  in.). As to the composition of coal, the quantity of volatile matter is, of course, of great influence; they work with "Six-Bonniers" coal, containing little gas (18 to 20 per cent.), which gives, however, good results. They have used with like success nearly all the coals of the Seraing basin—Ougrée, Cockerill, Epernay, Gossion, La Hayes, and Kessales. All have given the same results as to quantity, the consumption alone of coal per ton of iron has varied according to the proportion of rock being greater or less. Diminution of waste and improvement in quality naturally result from the almost complete non-admission of cold air, be it through the furnace door or through the grate, the latter being always covered by a pretty thick layer of fuel. The economy in waste amounts to 3 or 4 per cent.—that is to say, with 100 kilometres of puddled bars the loss in the furnace is only 9 or 10 kilometres, instead of 13 or 15, as they had regularly theretofore. They think they will diminish this waste considerably when experience shall have settled the best shape of certain parts of the furnace.

There is also a diminution in the cost of repairs. The two doors allowing an easy access to all parts of the hearth, the fettling can be properly kept in order. Moreover, as the coal never comes in contact with the bridges, they work for several weeks without requiring any repairs. As to the wear and tear of the fire-bars, it is mentioned that the low temperature at which they work in the fire-place, and the quantity of clinkers they can leave there without interfering with the working of the furnace, allow them to keep the grate always dark. The bars are said not to alter in the least, so that after five months' work 1½ in. bars still retain their sharp edges; and with regard to the workmen there is the advantage that with a uniform price per ton the men working on gas furnaces can earn 25 to 30 per cent. more than those working with ordinary furnaces.

As to the general advantages of the invention, it is mentioned that the gas furnace occupies less space than ordinary furnaces, that many of the castings of the old furnaces can be utilised, and that the workmen quickly learn to use the new furnace, as is evident by the fact that they have sent out nobody to start furnaces in works where the system has been adopted. It is estimated that the number of master puddlers of an iron works may be reduced by about one-half for the same production. That the number of toads to be taken care of diminishes in the same proportion; that the cost of building does not amount to 2000 frs. per furnace; that the production of steam is the same as that of two ordinary puddling furnaces; that the gases are completely burnt at their arrival in the chimney, for since the adoption of the gas furnace in our works one of the collective chimneys, which was formerly heated to an extent that we had to raise the refractory lining, keeps now nearly perfectly cold; that the system is the best adapted for the utilisation of the most irregular coal; that it leaves each ironworks free to make the bottom in scrap iron

or cinder, to cool the bridges by water or otherwise—in short, not to modify in these two respects anything in the custom of the iron-works, and in the habits always so deeply seated in workmen; and that the cleaning of the grate is less distressing than in ordinary furnaces, the cleaning not lasting so long, and their number being very much reduced, for the grates are only cleaned after two charges, and then only one-half of the grate.

#### HOW AND WHEN TO INVEST.

Although, probably to secure uniformity of title, the pamphlets from time to time noticed in the *Mining Journal* as having been issued for the guidance of investors by Mr. E. J. BARTLETT, of Great St. Helen's, are put forth as new editions only, it will readily be understood that as the information given is intended for use at the time, each edition may really be regarded as a distinct treatise. Referring to the recommendations in his previous edition (the present is the tenth), he points out that he then suggested eight securities for investment, and after tabulating the variations in price, he remarks that investment in the bonds would have resulted in an increase in the capital embarked, whilst in addition the dividends have been regularly paid. With reference to the mines, he shows that the employment of 100% in each of the three named would have resulted in a profit on market value alone of about 250%. There are, as usual, interesting chapters on Trade and Commerce, on British, Colonial, and Foreign Government Securities, Railways, Joint-Stock Banks, and Telegraphs, these being succeeded by two—on Coal and Mining—in which the readers of the *Journal* are more closely connected.

Few more eligible investments can, Mr. Bartlett says, be found than well-selected collieries. Unlike mineral properties generally, the extent of a coal field can be determined with certainty, and its future yield easily calculated. A metalliferous vein is liable to many modifications; a seam of coal is likely only to be deranged by what are termed faults. These are generally to be traced from the external conformation of the country. Any other difficulties, such as dykes of stone, which are seldom of more than a few feet in thickness, and cost but a trifle to pass through, are confined to certain localities, and are equally shown by surface indications. In England the nature and geography of our coal deposits has been so carefully studied that the geology of each district is well-known, and it is alone in the case of some new discovery that the faults or dykes may by chance not have been clearly defined. Such instances are rare, and even in them the general surveys which have been made, with other objects, serve to show with considerable precision the nature of the underground landscape. It may then be safely assumed that when the thickness of a seam of coal has been once ascertained, its extent, and the consequent amount of coal it contains, are matters of simple calculation. A coal property is similar to one in simple land, with the great advantage that the crop is not dependent on the seasons for its production; and though it may, of course, be exhausted with time, that may be ascertained at the outset. There are, he remarks, many sterling coal-producing properties at the present time, offering facilities for employment of surplus capital, shares in which remain at ridiculously low prices, from the simple fact that the investing public will rather believe the reports of foreign adventures or concerns thousands of miles away than the merits of undertakings within a few hours' journey, many of which would, he thinks, pay the capitalists well, and there can be a more favourable time than the present to employ surplus means.

Turning to metalliferous mining, Mr. Bartlett remarks that if properly conducted there are few more legitimate enterprises. Taking the amount of capital invested, and the profits which have been derived from mining, no form of investment will be found to have made greater aggregate returns. The reason why it does not stand so high as under the circumstances it ought is that in estimating returns the past is for the most part overlooked, and the present alone considered. As in other undertakings, there must be in mining, moments not only of special but of general depression. Looking dispassionately at the present state of mining in Cornwall and in other countries producing copper and tin, it is evident that the existing state of depression is due rather to a series of unfavourable circumstances in this country than to foreign competition. All branches of trade and industry are alike suffering from the same causes. Mining, as being peculiarly sensitive to such influence, is doing so to a greater degree than most others. When the recovery begins to set in, as there is every appearance of its doing, though the settlement of the labour question may delay it for some short time, mining will at once begin to recover; but as we have called into existence a very formidable foreign production, we must set about introducing all those improvements and labour-saving appliances which may enable us to produce our ores at the cheapest possible rates. After stating his opinion as to the most desirable channels for investment, he adds that it will take time to remove the sad want of confidence (existing in the minds of many), owing to the losses which have been sustained, or encourage the employment of surplus means in what is called speculative security, but the "clouds of trickery" are dispersing by the purifying action of the recent depression, and there remains a field of investment open, wide and good enough for all. Let caution only be exercised and a judicious outlay now will be almost doubled by the certain advance in prices of any securities possessing merit.

#### CHEMICAL HANDICRAFT.

Although professors always tell their students that a man is not worthy of the name of chemist unless he can make his own apparatus or utilise anything at hand, and although we have seen very accurate analytical work done by a noted chemist with only a few reagents and measures carried with him in a small unfurnished dressing case, the teacups and wineglasses obtainable in a small hotel far beyond the reach of ordinary civilisation, much more of chemical apparatus manufacturers, there can be no question that practically and under ordinary circumstances the chemist does not seriously lessen the business of the apparatus maker, as he very soon finds that there is vast economy both in time and cost in walking ten miles and paying 1s. 3d. for a Liebig's apparatus for the absorption of carbonic acid in a solution of caustic potash instead of attempting to make one himself, though he may have a fair number of pounds of glass tubing to practice upon. For this reason such volumes as "Chemical Handicraft,"\* although really no more than a large priced catalogue, will prove very useful to most who practice chemistry, since it will not only enable them to ascertain the price of any given piece of apparatus, but also to see at a glance whether any better form than that which has been accustomed to has been devised, or whether any cheaper substitute can be readily obtained.

Another useful application of the book is to assist those about to fit up chemical laboratories in determining how to secure the largest efficiency at the lowest cost. Whether his requirements be large or small he can readily accommodate himself. Thus there is the admirable set Nos. 4863 and 4864 specially arranged for class teaching, and described some 20 years ago by the Rev. F. Temple, H. M. Inspector of Schools. This Messrs. Griffin have modified by replacing such apparatus as has been improved upon in the interval, yet without interfering with the excellent general arrangement, and supply the set complete for 22/-, including chemicals, or 15/- 1s., without chemicals, so that there should be no difficulty in even limited schools in obtaining the requisite facilities for teaching chemistry generally. The volume gives hints on furnishing a laboratory, and other useful information. The gas furnace with which Mr. Griffin's name is so honourably connected has been already described in the *Journal*, but it may again be mentioned that it is very simple and efficient in operation. The crucibles have hitherto been either suspended in a pierced plumbeo cylinder, or supported on a trivet grate, both of which are liable to break when white hot, and, therefore, a cause of trouble and expense.

Crucibles vary so much in form and size that they are often not suspended from these cylinders exactly in the focus of the heating power. Trivet grates have the disadvantage that they interfere with the direct action of the flame upon the crucible, and it made slightly they break when heated to whiteness, but by the new form of burner devised by Mr. Griffin these defects are remedied. In the new burner the circle of gas jets are enlarged so as to leave a space round the central jet. An atmosphere similar to those used in Hofmann's combustion furnace, but of greater bulk and strength, is dropped over this central jet, and forms a solid support for the crucibles. This support does not readily break, but should an accident happen it can be replaced at the cost of a few pence. It brings the bottom of the crucible exactly into the focus of heat, and itself supplies a portion

\*Chemical Handicraft: a Classified and Descriptive Catalogue of Chemical Apparatus suitable for the Performance of Class Experiments for every Process of Chemical Research." By JOHN JOSEPH GRIFFIN, F.C.S. London: J. J. Griffin and Sons, Garrick-street, Covent Garden.

of the heating power of the burner. It also enables one to use any crucible at hand independent of its form or size. A strong lateral arm cast on the body of the burner supports an upright iron rod which carries the chimney of the furnace.

By prolonging the legs of the burner upwards they are made to carry the clay furnace, and thus by doing away with a stool or other support the construction is simplified and the cost lessened. A plumbeo cylinder to deflect the flame and entrap the heat is placed round the crucible, and is covered with an ordinary crucible cover, by removing which the crucible can be inspected. These fittings, however, are merely adapted from Griffin's blast-furnace, which was introduced many years ago. Access to the crucible in the furnace is gained by turning aside the chimney and lifting the top plate of the furnace, which is provided with handles for this purpose. These handles do not become very hot even when the furnace is at a white heat. The power of these new burners is very remarkable, one of small size consuming only 20 ft. of gas per hour, and having a diameter 4 ft. high, being capable of fusing ½ lb. of cast-iron in 35 minutes from the time of lighting the gas, or of melting gold, silver, or copper in crucibles placed within a muffle measuring 5 in. long by 3 in. wide. If a chimney 6 ft. high be employed cast-iron can be melted in crucibles placed within the muffle. These results, which are probably the highest yet placed within the reach of the chemist, are attainable with certainty and rapidity. The publication of the volume is certainly an additional service rendered by Mr. Griffin to practical chemistry, and from the high reputation he has ever enjoyed as an author of most instructive chemical works no fear need arise as to the reliance that may be placed upon every fact stated.

**DUST TO DUST: SANITARY MODES OF BURIAL.**—Under this title an interesting little pamphlet, addressed to his Grace the Duke of Sutherland, by Mr. Samuel Phillips Day, has just been published by Mr. Hodges, of King William-street, Strand. The opening chapter on the burial rites of various nations is full of information, and is calculated to do much to remove the prejudice against incineration. The next chapter shows the progress making for the reintroduction of incineration, and there are then capital chapters on mourning customs, the force of prejudice, and the chief objections to cremation; whilst the concluding chapters explain the real object of the book to advocate the use of Haden's basket coffins, and interment at Woking Necropolis. The pamphlet is ably written, and well calculated to attain the object in view. It is, moreover, admirably printed, and on an excellent paper.

#### Meetings of Public Companies.

##### COLORADO UNITED MINING COMPANY.

The ordinary general meeting of shareholders was held yesterday at the offices of the company, Great Winchester-street, Sir CECIL BEADON, K.C.S.I., in the chair.

Mr. J. F. H. TRAUTMANN (the secretary *pro tem.*) read the notice convening the meeting. The report and accounts were taken as read. The CHAIRMAN said, it was so short a time since he had last had the pleasure of addressing the shareholders, at the extraordinary meeting held in March last, that he had very little more to say. There was, however, one important piece of information regarding the working of the mine, which had been conveyed to the board by telegram, this was the announcement that \$15,500 worth of ore had been sold; but the agent had not reported the full quantity of ore that he had taken out of the mine, though it was known that he was working in the seventh and eighth levels in the Old Terrible Mine, and that he was taking out ore of considerable value. Hence he (the Chairman) thought they might congratulate themselves that everything at the mine was going on well. He thought, further, that they might now call Mr. Hamill, a friend of the company, for he was working most cordially with them, and was carrying on the operations in the two tunnels—the Silver Tunnel and the Chelsea Reach Tunnel—the latter of which it was expected would reach the Terrible lode at a lower depth than the company's tunnel would, and that in a very short time, whilst the other tunnel was expected to reach the Chelsea Beach lode, which was believed to be a very valuable one, in about the same time. Mr. Anderson (the secretary of the company) had been very busy during the past four months in preparing and completing the legal arrangements for the transfer of the property, and an agreement had been executed between Mr. Chaffey and Mr. Hamill on the one side, and the company on the other, by which they agreed to make over their property to the United Company, and subsequently to that there had been a regular deed of conveyance and quit-claim of all the lodes on all the property which previously belonged to them on that side of Brown Mountain. There was one difficulty the company had to contend with—the transfer of the property to an alien company, which could not be effected under the laws of the State of Colorado, this company having acquired the property before Colorado was made into a State. Trustees had, therefore, been appointed for the property, of whom Mr. Mofatt was one and Mr. Andrews the other, Mr. Andrews being about to declare himself a citizen of the United States, with a view of being thereby legally qualified to hold the property. Everything was going on satisfactorily, and voluminous letters had been received from Mr. Andrews, which were of a satisfactory character. Unfortunately the board were now compelled to devote the proceeds of the mine to its development; but the question might arise, though it had not done so yet, as to the desirability of securing a small loan on debentures. But if such a course were considered a desirable one by the board, the shareholders would have due notice of the intention of the directors to propose some such scheme, so that the shareholders would have an opportunity to consider the matter. Mr. Henty, the manager, gave the outside cost of the improvements necessary to develop the mine to its fullest extent at 6000/-, which he thought a small sum indeed. He (the Chairman) thought the thanks of the shareholders were due to the auditors (Messrs. Marshall and Colvin) for having examined the accounts without charging the company for their services. In conclusion, the Chairman moved the adoption of the report and accounts.

Mr. J. COOPE DAVIS seconded the motion.

Mr. WALKER suggested certain economies in the expenses, notably in the rent of the office, which he thought was too heavy.

The CHAIRMAN, in reply, said the amount placed in the accounts for general charges, office rent, &c., included stationery and printing. He could assure the shareholders that every attention was paid to economy by the board. The directors had not taken any fees for the last three years; if, however, the company became successful, as they all hoped, those fees would naturally be paid.

The report and accounts were then adopted.

The CHAIRMAN moved the re-election of the retiring directors, Messrs. J. Coope Davis and R. Maxwell Witham.—Sir HENRY RICKETTS seconded the motion.

Mr. WALKER objected to the re-election of Mr. Maxwell Witham, on the ground that that gentleman lived at Dumfries, and could not give sufficient attention to the affairs of the company.

The CHAIRMAN said Mr. Maxwell Witham represented the Scotch shareholders in the company, and sometimes attended the meetings of the board.

The motion was carried.

Mr. CLYDE proposed the re-appointment of the auditors, Messrs. W. J. Marshall and B. J. Colvin, thanking those gentlemen for their gratuitous services in connection with the auditing of the accounts.—Mr. WALKER seconded the motion, which was carried.

The proceedings closed with a vote of thanks to the Chairman and directors.

[For remainder of Meetings see to-day's Supplement.]

**CORNISH PUMPING ENGINES.**—The number of pumping-engines reported for May is 17. They have consumed 1930 tons of coal, and lifted 14,400,000 tons of water 10 fms. high. The average duty of the whole is, therefore, 50,800,000 lbs., lifted 1 ft. high, by the consumption of 112 lbs. of coal. The following engines have exceeded the average duty:

Dolcoth—55 in.	Millions
Mellinar—76 in.	59 0
Mellinar—Gundry's 80 in.	55 0
West Basset—Thomas's 60 in.	54 7
West Wheal Frances—58 in.	53 8
West Wheal Seton—Harvey's 85 in.	58 6
West Wheal Seton—Rule's 70 in.	61 8
Wheat Unity—Wood—70 in.	61 7

**CHEMICALS, MINERALS, AND METALS.**—Messrs. J. Berger Spence and Co. (July 1).—Acetate of Lime, 9/- 10s. per ton.—Alumina: Alum, 6/- 15s. for loose lump; ground, 7/- 15s.—Aluminous cake, 4/- 10s.—Ammonia: Sulphate, grey, 19/- 10s.; bead London white, 19/- 10s.; muriate—white, 27/-; sal ammoniac, firsts, 45s.; seconds, 44s.—Acid: Tartaric, English, ground or crystal, 1s. 6d.; foreign, 1s. 51/2d.; crystals; oxalic, 5d.; sulphuric, 3/- 10s. to 3/- 15s.; picric acid, 1s. 61/2d. per lb.—Arsenic: New Consols make 8/- 10s.—Bleaching Powder: At 5/- 5s.; for the whole of the year 1877, 6/-—Litharge: Best flake, 24/-—Metallic Salts: Iron salts, green and rusty copperas, 55s.; in casks or barrels, 60s.—Copper Salts: Sulphate of copper, 22/- 15s.—Magnesia: Epsom salts, 3/- 5s.—Nitrate of Soda: 1s. 6d. to 1s. 10s.—Potash: Muriates, 80 per cent., at 6s. 6d. per lb.; Prussiate, yellow, 10 1/2d.; chlorate, 9d.; biclorate, 4 1/2d.—Soda: Cream caustic, 60 per cent., 12/-; white, 60 per cent., 12/- 7s. 6d.; soda ash, 1 1/2d. to 1 3/4d.; soda crystals, 4/- 5s.; 1d. carbonate, 11/-; salt cake, 2/- 10s.; Glauber salts, 2/- 15s.—Sugar of Lead: Brown, 28/-; grey, 30/- 10s.; white, 37/-—Brimstone: Best thirds, 5/- 7s. 6d. to 5/- 10s.—China-clay: 15s. f.o.b. Cornwall; "Rosemelyn," 24s.; "BM," 34s.—Iron Ore: Hematite, 15s. to 22s. 6d.; Algerian, 53 per cent., 14s. f.o.b.—Manganese:

Ores, 90s. for 70 per cent.—Pyrites: Spanish cupreous, 5 1/2d.; non-cupreous, 6 1/2d.—Phosphate of Alumina, 3/- to 3/- 10s. per ton.—Phosphates: High strength, 80 to 85 per cent., 1s. 4d. to 1s. 5d. per unit; Estramadura, 1s. 3d.; ordinary, 50 per cent., 1s. 4d. to 1s. 5d. per unit;—Hematite, No. 1, 70s.; No. 2, 67s.; No. 3, 64s.; No. 4, 60s. net.—Hematite, No. 1, 70s.; No. 2, 67s.; No. 3, 64s.; No. 4, 60s.; No. 5 (mottled and white), 64s. 6d.—Bessemer, No. 1, 70s.; No. 2, 67s.; No. 3, 64s.; No. 4, 60s. net.—Copper: Chill bars, 63/-; B.S. ingot, 77/- 10s.; rough cake, 75/- 10s.; No. 3, 64s. net.—Copper: Chill bars, 63/-; B.S. ingot, 77/- 10s.; rough cake, 75/- 10s.—London—Spelter: Silesian, 20/-; English, 19/- 15s.; on rails, makers' works.—Tin: coal, 25s.; best coke, 23s.; coke, 22s.—Tubes and Fittings: Dis. on application.

Messrs. PIXLEY and ABEL—GOLD: The arrivals since our last have been very large, comprising 954,000t. per P. and O. steamer Bokhara, from Australia and the East, of which about 700,000t. in sovereigns; 204,000t. from the United States, and 4500t. from the Brazils. The bar gold has been taken for export, with the exception of 42,000t. sent into the Bank of England. 740,000 sovereigns have also been sent in, while 10,000 have been withdrawn for Rio. The Para, from the West Indies, has arrived with 20,000t. value in gold. The P. and O. steamer Indus took 550t. this day to Bombay.—SILVER: The arrivals have been limited, but a standard, the last-named quotation being the price of this day. The Para, from Southampton this day, takes 57,100t. to Bombay, 30,000t. to Calcutta, and 394,000t.

Messrs. VIVIAN, YOUNGER, and BOND—COPPER: The fluctuations in Chile bars during the past month have not exceeded 10s. per ton, with sales at 68/- 10s. for 60/- 5s. for g.c.b., spot and arrival (also with three months prompt at the latter figure), and of special brands at 69/- to 70/- as in quality. The charters as called from Valparaiso have been moderate for the past month—1200 tons fine for the first fortnight, and 1800 tons fine for the second fortnight. Of this 700 tons were taken for the rest, all the rest being in bars and ingots. The Swanso tickets were as follows:—On the 5th ult. 1880 tons British and foreign ores, averaging 13/- 4d. per unit for 13 1/2 16th per cent. produce. Cape ores of 32 1/2 per cent. realising 1s. 6d. per unit for 14 1/2 16th per cent. produce. Cape ores of 28 1/2 per cent. realising 1s. 6d. per unit for 14 1/2 16th per unit. No sale took place on Tuesday last, the 3rd ult. By private contract a cargo of Bolivian ores sold at 13s. 7d. per unit; and 270 tons Chilean regulus at Swanso at 14s.; also a cargo of Bolivian ores and regulus to arrive at Swanso at 13s. 6d. and 14s., respectively. In fine foreign transactions have practically off the market, and pending some announcement as to further sales, by auction or otherwise, 75/- up to 81/- has been paid for small quantities. Barra cake has sold at 74/- 15s. to 75/- 15s., and other brands of Australian at 73/- to 74/- 15s., as in quality. In manufactured smelters are fairly supplied with orders at present, a large purchase having been recently made for India of braziers' sheets at 80/-—TIN: Fluctuations during the past month in foreign ores have not exceeded 10s. to 15s. per ton. Australian has sold at 68s. down to 67s. 6d., rallying again to 68s., and again declining to 67s. 6d., fair quantities changing hands in this description, while "trails" has been less dealt in at 68s. to 69s. 9d. The June shipments from the Straits are advised by cable as 140 tons, 10 1/2d. per unit. On the 19th ult. 2190 tons British and foreign ores, averaging 13/- 4d. per unit for 14 1/2 16th per cent. produce. Cape ores of 28 1/2 per cent. realising 1s. 6d. per unit for 14 1/2 16th per unit. No sale took place on Tuesday last, the 3rd ult. By private contract a cargo of Bolivian ores sold at 13s. 7d. per unit; and 270 tons Chilean regulus at Swanso at 14s.; also a cargo of Bolivian ores and regulus to arrive at Swanso at 13s. 6d. and 14s., respectively. In fine foreign transactions have practically off the market, and pending some announcement as to further sales, by auction or otherwise, 75/- up to 81/- has been paid for small quantities. Barra cake has sold at 74/- 15s. to 75/- 15s., and other brands of Australian at 73/- to 74/- 15s., as in quality. In manufactured smelters are fairly supplied with orders at present, a large purchase having been recently made for India of braziers' sheets at 80/-—TIN: Fluctuations during the past month in foreign ores have not exceeded 10s. to 15s. per ton. Australian has sold at 68s. down to 67s. 6d., rallying again to 68s., and again declining to 67s. 6d., fair quantities changing hands in this description, while "trails" has been less dealt in at 68s. to 69s. 9d. The June shipments from the Straits are advised by cable as 140 tons, 10 1/2d. per unit. On the 19th ult. 2190 tons British and foreign ores, averaging 13/- 4d. per unit for 14 1/2 16th per cent. produce. Cape ores of 28 1/2 per cent. realising 1s. 6d. per unit for 14 1/2 16th per unit. No sale took place on Tuesday last, the 3rd ult. By private contract a cargo of Bolivian ores sold at 13s. 7d. per unit; and 270 tons Chilean regulus at Swanso at 14s.; also a cargo of Bolivian ores and regulus to arrive at Swanso at 13s. 6d. and 14s., respectively. In fine foreign transactions have practically off the market, and pending some announcement as to further sales, by auction or otherwise, 75/- up to 81/- has been paid for small quantities. Barra cake has sold at 74/- 15s. to 75/- 15s., and other brands of Australian at 73/- to 74/- 15s., as in quality. In manufactured smelters are fairly supplied with orders at present, a large purchase having been recently made for India of braziers' sheets at 80/-—TIN: Fluctuations during the past month in foreign ores have not exceeded 10s. to 15s. per ton. Australian has sold at 68s. down to 67s. 6d., rallying again to 68s., and again declining to 67s. 6d., fair quantities changing hands

for the traverse of such heated air and gases. The firing or heating of the contents of the kiln or chamber is continued until the incorporated materials assume the desired consistency, when the agglomerated material may be allowed to cool, and be then broken into the desired size or forms suitable for being employed in a blast-furnace or otherwise for the production of iron. In order to effect such cooling process and to utilise the residual heat he prefers to cause air to pass through the passages of the consolidated iron ore, and he employs the same for effecting the desired object—that of agglomerating the washed ore contained in a separate chamber or kiln in the manner described.

**VICE-CHANCELLOR MALINS ON LIMITED LIABILITY.**—Before the Select Committee appointed to enquire into the working of the Companies Acts 1862 and 1867 Vice-Chancellor Malins, in reply to the Chairman, said he had been an advocate of limited liability companies when he was in the House of Commons, and he was of the same opinion after 10 years' experience on the Bench. He was bound to say, however, that the system had been very much abused, as in the case of Overend, Gurney, and Co. He was of opinion that no companies should be started unless 1000*l.* at least was subscribed. In one case—he would not mention names—a company was formed by a financier amongst his clerks, and only 35*l.* was subscribed; but a few days after it was sold for 400,000*l.* The public were injured by this transaction, because they were induced to take shares in consequence of the company being formed in a well-known name. Difficulties should be thrown in the way of the formation of these bubble companies. He would not allow a company to borrow money unless a certain portion of the capital were paid up. To prevent such a state of things as that which was disclosed in the Eupion case, he would suggest that there should be some public officer whose duty it should be to settle the memorial Articles of Association, examine them for the purpose of preventing misstatements. Another great evil was that when a company was advertised and a certain number of shares applied for the directors commenced business. He knew one case in which a company advertised a capital of 250,000*l.*, but all that was subscribed was 1119*l.* in 50*s.* shares. The company at once commenced business, and effected a policy with a mercantile firm who believed the advertisement. A fire occurred, and it was then proved that the company had never had command of more than 300*l.* at one time. When application for the amount of the policy was made the company raised a frivolous and vexatious objection, alleging misrepresentation on the part of the insurers. The directors in such cases as these when the whole of the shares were not paid up, would not see the moral obligation that rested on them to pay the legitimate claims on the concern. He considered that, as in the case of *Twyccross v. Grant*, where a bribe was paid to the promoters of the company, and the fact was not made known in the prospectus, in that way concealing the liabilities of the company, there was palpable fraud committed. The capital in this case was 300,000*l.*, and all that could be found when the company was sold up was 9000*l.* in plant. The case was treated under the 33rd section of the Act of 1867. He would limit the operation of the section to cases where there was real and not accidental fraud. It was impossible to protect the public from fraud by legislation, the devices for the obtaining of money being so great and the ingenuity of man so considerable. He thought that original shareholders should be obliged to pay a deposit on application for shares, and further deposit on allotment. That would be some protection to the public.

**RESPONSIBILITY OF LIMITED COMPANIES' SHARES AFTER PAYMENT IN FULL.**—An important decision has been given in the Court of Appeal by the Master of the Rolls and Lords Justices James and Bagallay, affirming the decision of Vice-Chancellor Malins that in certain cases holders of shares in limited companies who have paid up in full are still further liable. The Maria Anna and Steinbank Coal and Coke Company (Limited) was formed with 160,000*l.* capital, in 10*s.* shares, to work some coal mines in Westphalia. The Articles of Association stated that six persons mentioned, shareholders in the company, had, for the purpose of paying part of the purchase-money for the mines, borrowed on the security of their joint and several promissory notes from the National Bank of Scotland the sum of 20,000*l.*, and from R. L. Jupp the amount of 10,000*l.*, to be repaid in two years, with interest at 8 per cent.; and, provided that the company should pay the 20,000*l.* and 10,000*l.* and interest respectively, and clause 5 of the Articles provided that "if the parties who have signed the above-mentioned notes for the said sums of 20,000*l.* and 10,000*l.*, or any of them, or the said company, shall be called upon to pay the said principal sums, or either of them, or the interest for the same respectively, and the said company shall not have in hand funds of the said company applicable to the payment thereof of sufficient amount, then and in such case each and every shareholder in the company for the time being shall contribute and pay to the company as a debt due to the company a proportionate amount of the sum or sums which the company shall be so called upon to pay, according to the number of shares held by each shareholder." The company was ordered to be wound up in 1873, and the assets were insufficient to meet the unpaid balance of the two debts of 20,000*l.* and 10,000*l.* The Vice-Chancellor held that the holders of fully paid-up shares were liable to contribute (in addition to the full amount of their shares) to the payment of the unpaid balance of these two debt in proportion to the number of their shares, and that the solvent shareholders must make up the deficiency resulting from the failure to pay of those shareholders who were insolvent. The shareholders appealed, but the Court of Appeal virtually confirmed the decision. The Master of the Rolls (Lords Justices James and Bagallay concurring) differed from the Vice-Chancellor only as to the extent to which each shareholder was bound to contribute. He agreed that each shareholder must contribute in the proportion which his share bore to the whole number of shares issued. But the articles contained only a covenant by each shareholder that he himself would pay, not that the other shareholders would pay, and, therefore, the solvent shareholders were not bound to make good the proportion which was not paid by the insolvent shareholders. The decision affirms the principle that the Articles of Association can attach liability beyond that indicated by the Memorandum of Association, and upon which reliance has hitherto been placed.

**NEW METALLIC ALLOY.**—A novel method of producing alloys has been invented by Mr. FRANK RAYMOND, of Greenville, South Carolina. It consists in melting mica and mixing the same with any metal or composition of metals while the same is being melted, thereby rendering the metals harder, admitting of better finish, preventing corrosion or rust, less susceptible to effect by fire, heat, or friction, and more durable. He proposes to take of mica the quantity necessary to produce the desired effect, and a relative quantity of borax, saltpetre, and soda, or either or any two of them, and place the same in the crucible or furnace, together with the necessary quantity of metal or metals, and melt the whole in the usual way. The borax, saltpetre, and soda will cause the mica to melt, when it will mingle with the metal or metals in the crucible or furnace, producing the effects mentioned. In carrying the invention into operation, the ingredients have been compounded in the following proportions—Lead, one part; zinc, one part; mica, two parts; also brass, three parts; copper, one part; zinc, one part; lead, one part; mica, four parts; also copper, four parts; mica, four parts; tin, one part; lead, one part.

**PETROLEUM.**—Regarding refined petroleum oil, Messrs. S. C. Joyce and Co. report that notwithstanding the arrivals, the market has been very firm in all positions, with a good demand for spot oil, which has ruled from 10*s.* d. end of last week on the American quotation coming better, to 10*s.* d. through the early part of this week. Month oil has sold at 10*s.* d., and August at 10*s.* d. For last four months deliveries buyers have rather held off, not caring to meet the firmness in values; a small quantity has been sold at 10*s.* d. up to 1*d.* Closing prices—Spot, 10*s.* d.; August, 10*s.* d., last four, 1*d.* sellers. Import cost about 10*s.* d., 10*s.* d. landed.

Total stock in sight at the large northern continental market is . . . . . 931,600  
Total stock same time last year . . . . . 615,500  
Total stock same time 1875 . . . . . 1,081,000  
Deliveries Jan. 1, 1877, till July 7 . . . . . 952,250  
Deliveries same time last year . . . . . 929,000  
Deliveries same time 1875 . . . . . 779,000  
London stocks and deliveries—afloat and loading, about . . . . . 40,000

#### FOREIGN MINES.

**SIERRA BUTTES (Gold).**—Sierra Buttes Mine: Receipts, £32,028; total California expenses, including cost of mining and milling, £21,897.—Plumas Eureka Mine: Receipts (including sulphurites), £39,524; total California expenses, including cost of mining and milling, £16,817.

**LONDON AND CALIFORNIA.**—The result of the working at the Original Amador Mine for the month of June is estimated at £9000.

**RICHMOND CONSOLIDATED.**—R. Rickard, June 18: The ore discovered in the end of the 500 west drift has been opened on to the extent of 40 ft. in length and 12 ft. in width; the ore as far as seen is on an average of low grade. We are now preparing to sink on the ore; to an appearance we are on the top of an ore body, and in sinking on it I expect the ore will improve in value. All the other work being done to develop the western ground is progressing favourably. There is nothing new in any other part of the mine.

R. Rickard, June 25: Since my last No. 1 rise, in back of the 500 drift, has been risen to the level of the 400 drift; the 400 drift is being pushed forward to make communication with the rise; in back of this rise there is still ore, but of low grade. No. 2 rise is up 25 ft., with low grade ore in the back. We are now crossing out from the end of the 500 drift to the north, to cut the ore which is dipping over the drift in that direction. The 600 drift west is in hard ground—slow mining is consequently made. Nothing new in any other part of the mine since my last.

**FLAGSTAFF.**—A cable despatch has (July 13) been received from the directors at Salt Lake City to the effect that "everything had been arranged satisfactorily, the payment of interest on debentures secured, and expenses for offices provided. The floating debt has been provided for, and is being reduced rapidly. The mine is working satisfactorily, and law proceedings against the company failing."

**JAVALL.**—The manager (June 6) states that the mill worked 10*s.* days, crushing 1400 tons of quartz, which produced 40*1/2* ozs. of bullion. The remittance is valued at 10*s.* 6*d.* and the expenses for the month amounted to 91*s.* 10*s.* 6*d.*, including 17*s.* 8*d.* on capital account. Rain had begun to fall in showers, and it was hoped that water power would soon be available for the mill.

**SAN PEDRO (Silver).**—S. Phillips, June 1: In the 165 fm. level the cross-cut driving towards the manto by four men has been very hard and wet during the month. We have not driven more than 4-50 metres during the past month, but the men have worked well. In the last two or three days the ground has become somewhat easier, and at times we meet with veins of yellow bronze which to me seems a good indication of meeting with something rich when we cut the manto. We are now in somewhat more than 17-50 metres from the shaft, and according to the distance of the manto from the shaft at the 150, we have six or seven metres more to drive to get into the manto. Although the ground is easier for driving, the coming water is more, which makes it hard work and retards the progress. Coming water about 2400 gallons daily. The winze in the bottom of the 150, sinking in the manto, is progressing favourably, and is producing good stones of yellow bronze, but as yet not sufficient to value; but the manto in the bottom of the winze is more promising than when our last report was forwarded. The cross-cut towards the Manto Verde is still poor, and hard for driving. We have two men stops in the back of the 135, in a side of bronze ground, producing 2 tons of 17 per cent. ore per fathom. The tribute pitches in the 88 and 47 are not quite so good as when last reported, but still leaving a small profit.—Old Pit: The slope a few metres below surface in the old works will produce 2*1/2* tons of 20 per cent. ore per fathom.—Manto Verde: The tribute pitch at this manto will leave a small profit to the mine. The output for this month will, I think, be about the same as that for last month. Everything inside and out is working in a satisfactory manner.

**CONDES COMPANY OF CHILI.**—J. Seccombe, June 1: Smelting Works: After much delay in getting a supply of fuel, in consequence of the rain, we are in irregular work with one furnace making regulus, and I expect the blast-furnace will be working again to-morrow. I hope at last that this furnace will go well, and result in more economical smelting than with the reverberatory furnace.—Telegrams: The following telegrams referring to later dates than the foregoing report have been received:—On June 11, dated Valparaiso, June 8—"15 tons of regulus and 40 tons of raw ore have been shipped per John Elder." Our furnaces are at present producing per day 2 tons of regulus. Road to the mines is open. Have commenced carrying ores from the mines. Ground favourable, and good progress making. Operation progressing satisfactorily." On June 20, dated Valparaiso, June 20—"23 tons of regulus and 7 tons of ores have been shipped per Copotaxi, 500 tons of ore (including fluxing ore) are at Corral Quemado, intended for smelting. The fluxing ore on hand are sufficient, and the produce will come forward without delay." On July 7, dated Valparaiso, July 6—"9 tons of regulus and 10 tons of raw ore have been shipped per Iberia."

**CAPE COPPER.**—The Ookiep, Spectakel, and Trial Mines reports for May have been received. No material change in them from the last. Capt. Tonkin writes of Ookiep. . . . . The 80, east from No. 19 winze, has improved during the month, the present end being now worth 4 tons of purple ore per fathom, with every appearance of shortly becoming still more valuable.—Returns for May: Ookiep 950 tons of 32 per cent., Spectakel 33 tons of 22 per cent.—Bills of Lading Received: 73 tons per Anglican, 80 tons per African, 400 tons per Constante, and 400 tons per Selima.—Arrival at Port Nolloth: The Marlin.—Sales by Public Ticketing: On June 19, 249 tons, at an average of 13*s.* 10*1/2* per unit, realising approximately 4*1/2* tons. On July 10, 550 tons, at an average of 13*s.* 10*1/2* per unit, realising approximately 11*3/4* tons.

[For remainder of Foreign Mines, see to-day's Supplement.]

**BEDFORD UNITED MINES.**—This old established and well conducted mine appears to be again coming to the fore, and ore more likely to follow its celebrated neighbour, the Devon Great Co. sols, and to attain a position on our Dividend List. The mine is evidently being developed most vigorously, and under the old and approved system of mining, so widely different from the present—that is, taking ore away as fast as it is discovered. A reference to the proceedings at the meeting on Wednesday last will show that a large quantity of ground is almost available for increasing returns. The value of a concern is best seen in its resources, and under the present able management, and with the security of limited liability, the shareholders and the public may feel satisfied that a good and safe investment may be found in this well-known concern.

LEAD ORES.					
Date.	Mines.	Tons.	Price per ton.	Purchasers.	
July 5	Great Laxey	100	£21 2 0	Nevill, Druce, and Co.	
9	Caldbeck Fells	6 12 0	11 17 0	ditto	
—	ditto	3 14 0	8 13 0	ditto	
12	Talargoch:—				
	Maesyrerwedd	50	13 11 6	Adam Eytom.	
	Cotcia Llys	30	13 16 6	ditto	
	North Hendre	100	12 11 6	Walker, Parker, and Co.	
	Rhdy Alun	15	12 2 6	ditto	
	Prince Patrick	20	13 1 6	Adam Eytom.	

BLENDÉ.					
Date.	Mines.	Tons.	Price per ton.	Purchasers.	
July 10	Talargoch	60	£2 12 6	Bagilt Smelting Co.	
—	ditto	60	3 9 6	ditto	
—	ditto	60	3 7 6	Tindale Spelter Co.	

COPPER ORES.							
Sampled June 27, and sold at Swansea, July 10.							
Mines.	Tons.	Produce.	Price.	Mines.	Tons.	Produce.	Price.
Cape Ore	66	273 <i>1/2</i>	£18 19 6	Cavera	84	81 <i>1/2</i>	£5 5 0
ditto	66	273 <i>1/2</i>	18 19 0	Beatts Cove	110	11 <i>1/2</i>	8 2 0
ditto	65	273 <i>1/2</i>	19 0 0	ditto	110	11 <i>1/2</i>	8 2 0
ditto	65	273 <i>1/2</i>	19 5 6	Moonta Ore	54	26 <i>1/2</i>	18 11 0
ditto	75	34 <i>1/2</i>	24 5 6	ditto	53	26 <i>1/2</i>	19 5 0
ditto	74	34 <i>1/2</i>	24 1 0	ditto	39	28 <i>1/2</i>	18 15 0
ditto	77	28 <i>1/2</i>	19 13 6	Carracedo	100	12	8 11 0
ditto	71	28 <i>1/2</i>	19 13 0	ditto	7	11 <i>1/2</i>	9 2 6
ditto	73	8	4 16 0	ditto	18	7 <i>1/2</i>	6 1 6
ditto	73	8	4 16 0	Aljustrel	81	4 <i>1/2</i>	2 14 6
ditto	12	14 <i>1/2</i>	9 4 6	ditto	16	21	4 5 6
ditto	3	14	9 1 0	ditto	7	19 <i>1/2</i>	13 12 0
41	8 <i>1/2</i>	5 1 0	Copper Reg.	10	33 <i>1/2</i>	22 5 6	
1	59	38 18 0	ditto	7	28 <i>1/2</i>	19 7 0	
Kurilla	61	29	13 16 6	ditto	5	30	20 0 0
60	29	13 16 6	ditto	8	19 <i>1/2</i>	20 2 0	
60	13 <i>1/2</i>	8 19 0	ditto	8	35	23 14 0	
47	20 <i>1/2</i>	14 4 6	Copper Ore	15	2 <i>1/2</i>	15 2 6	
47	20 <i>1/2</i>	14 2 6	ditto	8	4 <i>1/2</i>	2 10 6	
Cronebane	100	23 <i>1/2</i>	1 6 0	Australian	19	12 <i>1/2</i>	8 5 0
95	25 <i>1/2</i>	1 4 0	New Quebrada	14	19 <i>1/2</i>	13 17 0	

## WATSON BROTHERS' MINING CIRCULAR.

Ten years ago the weekly information which had previously been published for a great number of years in WATSON BROTHERS' Mining Circular was transferred to the columns of the *Mining Journal*, with the following announcement; which is now reproduced in consequence of the numerous letters and enquiries handed to them of late in reply to one which appeared in the *Journal* on the Clementina Mine.

The great extension of mining business, the difficulty so often complained of by country shareholders in getting accurate and disinterested information as to the state of Cornish and Foreign Mines, and of the financial and real position of mining companies generally, have induced Messrs. WATSON BROTHERS to make their Circular now published in the *Mining Journal* more extensively known, and to state—

That they issue daily to clients and others who apply for it a Price List (as supplied to most of the London and country papers), giving the closing prices of Mining Shares up to Four o'clock.

They also buy and sell shares for immediate cash or for the usual fortnightly settlement in all Mines dealt in on the Mining and Stock Exchanges, at the close market prices of the day, free of all charges for commission. They deal also, on the same terms, in the Public Funds, Railways, Telegraphs, and all other Securities dealt in upon the Stock Exchange.

Having agents in all the mining districts, they are constantly getting mines inspected for their own guidance, and will also obtain special reports of any particular mine for their clients, for the inspecting agent's fee of £2 2s.

In the year 1843, when mining was almost unknown to the general public attention was first called to its advantages, when properly conducted, in the "Compendium of British Mining," commenced in 1837, and published in 1843, by Mr. WATSON, F.G.S., author of "Gleanings among Mines and Miners," "Records of Ancient Mining," "Cornish Notes" (first series, 1862), "Cornish Notes" (second series, 1863), "The Progress of Mining," with Statistics of the Mining Interest, annually for 21 years, &c., &c. In the Compendium, published in 1843, Mr. WATSON was the first to recommend the system of a "division of risks" in several mines, ensuring the success in the aggregate, and Messrs. WATSON BROTHERS have always a selected list on hand. Perhaps at no former period in the annals of mining has there been more peculiar need of honest and experienced advice in regard to mines and share dealing than there is at present; and from the lengthened experience of Messrs. WATSON BROTHERS they are emboldened to offer, thus publicly, their best services and advice to all connected with mines and mining.

Messrs. WATSON BROTHERS are daily asked their opinion of particular mines, as well as to recommend mines to invest or speculate in, and they give their advice and recommend mines to the best of their judgment and ability, founded on the best practical advice they can obtain from the mining districts, but they will not be held responsible, nor subject to blame, if results do not always equal the expectations they may have held out in a property so fluctuating as mining.

WATSON BROTHERS,  
MINE OWNERS, STOCK AND SHARE DEALERS, &c.,  
1, ST. MICHAEL'S ALLEY, CORNHILL, LONDON.

D'ERESBY MOUNTAIN.—There is a splendid lode in the deep level started since our visit, and a tramway is to be put in forthwith. There is a fair prospect of this mine becoming one of the best in the district.

CLEMENTINA.—The reservoir is in progress, and will be completed in a few weeks, when there will be no more stoppages for want of water. A new 30-ft. wheel is to be erected as soon as possible, and this, it is confidently hoped, will put the mine in a paying condition.

SATURDAY, JULY 7.—Tankerville has been in good demand, and close firm at 7½ to 8; Leadhills, 6 to 6½; Roman Gravels, 9½ to 9¾; East Van, 5½ to 6; Glenroy, 20s. to 25s.; North Laxey, 18s. to 20s.; Parry's Mountain, 10s. to 12s.; Rookhope Lead, 20s. to 22s. 6d.; Great Laxey, 20 to 21; Van, 34 to 36.

MONDAY, JULY 9.—Market quiet, and shares in lead mines generally weaker. Roman Gravels, 9 to 9½; Tankerville, 7½ to 8½; East Van, 5½ to 5¾; North Laxey, 18s. to 20s.; Ladywell, 1 to 1½; Parry's Mountain, 9s. to 11s.; West Tankerville, 19s. to 21s.; Great Laxey, 20 to 21; Leadhills, 6 to 6½; West Chilverton, 14 to 16; Van Consols, 10s. to 12s. 6d.; Glym, 7s. 6d. to 12s. 6d.

TUESDAY, JULY 10.—Market very quiet. Roman Gravels, 8½ to 9½; Leadhills, 5½ to 6; East Van, 5½ to 5¾; Glenroy, 20s. to 25s.; Glym, 5s. to 7s. 6d.; Gr at Laxey, 20 to 21; North Laxey, 18s. to 20s.; Parry's Mountain, 10s. to 12s.; Penstruthal, 4s. to 6s.; Rookhope Lead, 20s. to 22s. 6d.; Tankerville, 7½ to 8½; Van, 33 to 35, ex div.; Van Consols, 7s. 6d. to 10s.; Crebor, 1½ to 2; Devon Consols, 4½ to 5; Carr's Brea, 23 to 30; Dolcoath, 23 to 30; Tincoff, 12 to 14; West Chilverton, 14 to 16; West Tankerville, 19s. to 21s.

WEDNESDAY, JULY 11.—Market continues very inactive, and prices in some cases weaker. Roman Gravels, 8½ to 9; North Laxey, 18s. to 17s. 6d.; West Tankerville, 17s. 6d. to 20s.; Rookhope Lead, 19s. to 21s.; Tankerville, 7½ to 7½, and firm; Parry's Mountain, 11s. to 13s.; Van, 33 to 35, ex div.; Glenroy, 20s. to 25s.

FRIDAY, JULY 13.—Market again quiet, the dealers being principally engaged with the settlement. Rookhope Lead, 20s. to 22s. 6d.; Van, 33 to 34; Great Laxey, 20 to 21; North Laxey, 18s. to 20s.; Leadhills, 5½ to 6; Roman Gravels, 8½ to 9½; Parry's Mountain, 11s. to 13s.; Tankerville, 7½ to 7½; Grenville, 1½ to 2; West Chilverton, 14 to 16.

## THE WEEK.

SATURDAY, JULY 7.—During the last week, without attracting much attention, a serious drop has been going on in gas shares. The cause assigned is that recent experiments with a new electric light show it likely to prove a formidable competitor by-and-by; but, apart from this, most stocks have been a long time too high. They were run up at the commencement of the year, when there were rumours that the Government might probably buy the existing companies up. Gas-light and Coke, A, dealt in to day at 10s. was with 20s. a week ago. There has also been a fall of 1½ in London Gas, and one of 10s. 10s. in Commercial Gas. The closing prices of those three companies were the worst of the day. Tramway shares were quoted thus—Dublin, 18 to 18½; Edinburgh, 14½ to 15½; Glasgow, 10 to 10½; Liverpool, 13½ to 14½; London, 10 to 10½; London Street, 11½ to 12; North Metropolitan, 18½ to 16½; Provincial, 8½ to 9½; Tramways, Union, 4½ to 4¾.

MONDAY, JULY 10.—A further fall occurred in gas shares. Commercial, London, and Gaslight and Coke, each closed 5½ lower. The depression extended to Oriental and Bembridge, the former closing 17½, and the latter at 6½. Central Illinois shares are now in the ascendant, and may probably go a little higher still; they touch 6½ to 7½. London and Yorkshire Bank, 2½ to 3, paid, were quoted 1½ to 1¾. Van Consols and Glyn were dealt in at 10s. Pen-truthal and Exchequer were in request at 5½ to 6. Chapel House shares were quoted 2½ to 3; Newport Abercarn, 2½ to 3; and Alltarni, 4 to 4½. Roman Gravel shares were offered, and did not close better than 9½. Van Consols and Glyn were quoted 5s. to 7s. 6d., the former "made up" at 2s. 6d. Parry's Mountain, being found scarce, went up to 11s. 13s. Kippax, 2 to 2½. Stern Buttes, 1½ to 2½.

TUESDAY, JULY 11.—Central Illinois shares touched 5½, and do not seem to have touched their highest yet. The highest last year was 83s, and the lowest 55s. The last dividend was one of 4 per cent. For years previous to 1873 the company paid currency dividends of 10 per cent. The report of the London and Yorkshire Bank has been issued, and discloses a very satisfactory state of things. The usual dividend of 4 per cent. will be payable next week. The shares, with 2s. 6d. paid, may be had at 13s, which includes the dividend. Lower prices prevailed in mining shares. Roman Gravels gave way to 9, and Tincoff to 13. There was a fall of 5s. in Exchequer, to 6½. There is still a large dead expenditure going on here. Van Consols, 3½ to 4; Glym, 6s. to 8s.; West Tankerville, 7s. to 11; Derwent, 2½ to 2½; Llanrwst, 2½ to 2½; Patey Bridge, 1½ to 2½; Leadhills, 5½ to 6; Parry's Mountain, 9s. to 11s.; Penstruthal, 5s. to 7s. 6d.; Exchequer, 6s. 3d. to 8s. 9d. In the Telegraph market Reuter shares fell 1½, to 1. It is doubtful whether they are worth less than 1. The settlement commences to tomorrow.

WEDNESDAY (Continued on page 7).—The rates ruling to-day were higher than last time, the "bull" account having been one heavier. On Midland, York, A, and Birmingham there was again a backwardation, but all these stocks closed considerably lower. The South Eastern dividend was announced early in the morning as one of 3½ per cent., against 3½ per cent. last year. This was regarded as disappointing, the D-ferred closing at 11, after touching 11½. The Northumbria Coal and Iron Company announced a dividend of 2½ per cent. Pawson and Co. will pay 5 per cent., and carry forward over 6000. Central Illinois went to 5½, and Erie shares closed at 3½. Roman Gravels were again offered, and will soon, unless a recovery sets in, be but little over par. Buyers to day were unwilling to give more than 9½. Van Consols and Glyn were quoted 5s. to 7s. 6d., the former "made up" at 2s. 6d. Parry's Mountain, being found scarce, went up to 11s. 13s. Kippax, 2 to 2½. Stern Buttes, 1½ to 2½.

THURSDAY.—The directors of Great Laxey have declared a quarterly dividend of 8s. per share, and a bonus of 2s., payable on the 24th inst. The shares are 20 to 21, and can be bought to pay nearly 10 per cent. When this dividend has been paid each 4s. share will have received back 22s. 3s. In other words, an expenditure of 60,000/l. will have produced a profit of 3½ 000/l., and is represented itself by something like 300,000/l. The Cage Copper accounts for the year have been issued, and show that the value of the ore raised during last year was over 240,000/l., leaving a net profit of 90,000/l. Of this 8½ 000/l. has been divided among the shareholders (4s. per share), and a large balance carried forward. The dividends received here on each 7s. share up to the present time has been 28s. 15s. Private accounts from Cairns mention that the sums necessary for the payment of the coupons of the Unified D-ent due on the 15th inst. have been encashed.

FRIDAY (Opening).—The railway market is very firm. Dover, A, is up to 11s. and Brighton, A, to 10½. The Brighton dividend is expected to be known to-day. In mining shares North Laxey are rather better, an improvement at the mine being reported. Roman Gravels stronger, and quoted 8½ to 9. Enderhaldit at 6½ to 6¾. Patey Bridge, 1½ to 2. Boddiris, 3½ to 1. Van Consols, 2½ to 3. Glym, 5 to 5½. Penstruthal, 4s. to 6s. Chapel House, 2½ to 2½. Llanrwst, 2 to 2½. Aberlauant, 10s. to 12s. 6d. East Van, 5½ to 5¾. West Tankerville, 7s. to 11; ditto Prof., 1½ to 2. Glynroy, 1 to 1½. North Laxey, 2½ to 3. Parry's Mountain, 10s. to 12s. 6d. Two o'clock.—The market continues firm in tone, railways especially. The Sheffield dividend has also been circulated, and is 1 per cent.—as usual a surprise. Egyptian Preference have been dull, below 60, but are now 60½ to 62½. Ruskin, 12 to 12½. Flinlimmon, 4s. to 6s. Rio, 1s. 8d. to 2s. 6d. Malabar, 4s. to 6s. Exchequer, 6s. to 8s. Flinlimmon, 8s. to 8½. Expans, 2½ to 3½. Javell, 8s. to 10s.

Chontales, 5½ to 6. Don Pedro, 3½ to 4. Four o'clock.—Dover, A, has reached 11s, which is a rise of 1 per cent. on the day. Districts are better. Pennerley, 1½ to 3½. Tankerville, 7½ to 7¾. Bampfylde, 3½ to 4. Cedar Creek, 5½ to 6. Gold Run, 5½ to 6. London and Yorkshire Bank, 1½ to 1½ (2s. 6d. paid). Bircham-Tane, July 13.

FERDINAND R. KIRK.

## Mining Correspondence.

## BRITISH MINES.

ABERDAUNANT.—S. Toy, July 11: The new shaft is sunk 5 fms. 3 ft. below the deep adit level. In the east part of the sett (Crownwlm) I have set the cross-cut to drive towards the new lode, by six men and one boy, at 10. 10s. per fathom, for the month. There is no change worthy of remark during the past week.

ASHETON.—John Craze, Joel Manley, July 12: The lode in the 60, east of the town, is large, composed of spar, with good spots of lead ore. No change in the 50, east of Mausr south, on north and south lode, since our last. The lode in the 20 east, on north and south lode, has very materially improved; now worth about 12s. per fathom. No other change to note.

BEDFORD UNITED.—R. Golsworth, William Phillip, July 10: Since the last general meeting the engine shaft has been sunk 7 fms. 5 ft. The 127 fm. is driven east 7 fms. 1 ft. 3 in.; west, 8 fms. 2 ft. The 116 fm. level east 7 fms. 4 ft. 9 in.; west, 6 fms. 5 ft. 3 in. The 103 fm. level east 4 fms. 20 in.; west, 4 ft. 10 in.; west. The 97 east, on the south lode, 3 fms. 5 ft. 3 in. The winze sunk in the 103 east 3 fms., and in the same level west another winze 11 fms., making a total of 64 fms. 1 ft. 4 in. The engine-shaft is now down to the 138, but we intend to sink 3 ft. deeper for a fork. Throughout this depth (11 fms.) the shaft has been very productive, the average value of the lode being 57s. per fathom for the length of shaft. The lode in the 127 east has been disordered for some distance, but is now looking more kindly, and producing good stones of ore. In this level west the lode is worth 10s. per fathom, and promising for further improvement. The lode in the 116 east is again improving, at present worth 12s. per fathom, and no doubt will become more valuable as the end approaches the winze from the 103 east; in this level west the lode is producing stones of ore, not sufficient to value. The lode in the 103 east has a very promising appearance; it is composed of congealed calcite, quartz, mica, and copper, letting out water freely, worth 10s. per fathom. This end is considerably in advance of the 115, and is most encouraging for the other levels being extended eastward; in this level west the lode is at present small and poor. The lode in the winze sinking in the 138 east has proved productive from its commencement, varying in value from 25s. to 30s. per fathom, the latter being its present value. The winze in the 105 west is communicated to the 115. The lode has been productive, and laid open good ground for stowing, and also ventilated the western part of the mine. There are four stopes in the 115 and 103, which are worth on an average 12s. each per fathom. During the past year the engine-shaft has been made good to the 127 fm. level, top and trip stope cut at that level, and the shaft sunk to the 138, the pumping wheel thoroughly repaired, a new angle-bob fixed, and a long column of pumps laid down to convey water for condusing and dressing purposes. The drivages in the different levels (east and west) amount to 15 fms. 6 ft. 10 in.; cross-cut, 1 ft. 3 in.; winze sunk, 20 fms. 3 ft. 6 in.; rise, 5 ft.; engine-shaft sunk, 16 fms. total 149 fms. 0 ft. 4 in. It will be seen from the foregoing that a large quantity of ground is being laid open, and as the greater portion of the drivages has been through productive ground, and the shaft proving a good course of ore from the 127 to the 138, we consider our prospects most encouraging for the future. Every effort is being made to get the drawing engine to work in a few days, and we purpose as soon as this is completed to set more stopes, and thereby increase the returns.

BODDIRIS.—H. Golsworth, July 11: The stope in the bottom of the 30 yard level has been producing good ore up to yesterday, when we met with an obstruction in the stope of a small cavity containing spar and clay, with solid lumps of lead ore therein, with a firm heading-wall under, being north about 2 ft. in. in the east end of the stope; the ore varies from 1 to 4 in. in width—solid. I have put two men for the present to open the small gas shaft, which is about 20 yards east of our present winze, as I am informed that the old men left some good out in the bottom of the shaft; the ore is very hard, and I have reason to believe have been brought on a side lode or joint similar to the one we now have in the 30. This will take a few days to unwater and clear out the stuff; directly this is done I will inform you of the result. The lode in the 45 end driving east is close and unproductive at present, but fair progress is being made in this driving. At the 45 east, fresh shaft, I have put two men to cut into the north side of the level, to ascertain if there is a side joint here similar to what we have in the 30. I am pleased to say that after driving 2 ft., we met with a small joint this morning, containing spar and spots of lead ore. I shall still push on here, as I think there is more lode standing to the north. The lode in the 50 end driving east is 18 in. wide, chiefly spar, with two well-defined walls; both the lode and ground are extremely hard, but very promising for the production of lead ore. The cross-cut driving south is still in

the 45 end, and is being driven for a further 10 fms. to the 50 end.

BODDIRIS.—H. Golsworth, July 11: The stope in the bottom of the 30 yard level has been producing good ore up to yesterday, when we met with an obstruction in the stope of a small cavity containing spar and clay, with solid lumps of lead ore therein, with a firm heading-wall under, being north about 2 ft. in. in the east end of the stope; the ore varies from 1 to 4 in. in width—solid. I have put two men for the present to open the small gas shaft, which is about 20 yards east of our present winze, as I am informed that the old men left some good out in the bottom of the shaft; the ore is very hard, and I have reason to believe have been brought on a side lode or joint similar to what we have in the 30. This will take a few days to unwater and clear out the stuff; directly this is done I will inform you of the result. The lode in the 45 end driving east is close and unproductive at present, but fair progress is being made in this driving. At the 45 east, fresh shaft, I have put two men to cut into the north side of the level, to ascertain if there is a side joint here similar to what we have in the 30. I am pleased to say that after driving 2 ft., we met with a small joint this morning, containing spar and spots of lead ore. I shall still push on here, as I think there is more lode standing to the north. The lode in the 50 end driving east is 18 in. wide, chiefly spar, with two well-defined walls; both the lode and ground are extremely hard, but very promising for the production of lead ore. The cross-cut driving south is still in the 45 end, and is being driven for a further 10 fms. to the 50 end.

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## NOTICES TO CORRESPONDENTS.

\* \* \* **Non-inconvenience having arisen in consequence of several of the Numbers during the past year being out of print, we recommend that the Journal should be sent on receipt; it then forms an accumulating useful work of reference.**

**BURY CONSOLIDATED MINING COMPANY.**—It is a long time since information in reference to the above company appeared in your esteemed Journal. Can any of your numerous correspondents enlighten one as to the present position and prospects?—A CONSTANT READER: *July 10.*

**FOREIGN MINES**—“R. E. W.” (Leeds).—We never interfere in the negotiation of sales or purchases of mines or mine shares of any kind. Many of the share-dealers, however, whose advertisements appear weekly in the Journal, undertake that class of business, and to these “R. E. W.” would do well to apply. It would be unfair to recommend anyone in particular, and it is unnecessary, since the exchange of the usual banker's references is always sufficient in commercial affairs. Should “R. E. W.” have particulars of the mines or districts of general interest they will be published without charge.

**LIABILITY IN COST-BOOK MINES.**—I shall be glad if some correspondent will furnish information as to the position and prospects of the Drake Walls Mine. Is it correct that the Statuary Laws prevent a company being wound up on the petition of a shareholder, and that the relinquishment of shares is the only mode of obtaining release? In the case of Drake Walls, call after call has been made, and there seems no prospect of an end of them, yet the mine has disappeared from the Share List, and is said not to be ready at work. I should like to know the state of the law I have referred to, the names of the promoters and directors, the position and probable prospects of the mine, and the cause as far as known of the apparent collapse? The shareholder not having signed anything is he bound to continue to pay calls?—J. G. B., *Saltcoats, July 9.*

**NORWEGIAN SUBSCRIPTIONS**—“J. D. H.” (Kaafjord).—We have had no previous complaint of overcharge by the Norwegian Post Office, though many copies of the *Mining Journal* are sent into Norway each week. “J. D. H.” does not say whether he pays his subscription to a Norwegian or English house. We address him this day's *Journal* in red ink, and post it in the usual way. If there be any surcharge on delivery he will oblige by letting us know; if not, he can so obtain it at 11. 10s. 4d. per annum, payable in advance by International Post Office Order, or ordered through the London office of the works he is connected with.

**Received**—“F. M. F. Cazin (Bernalillo, N.M.)—“G. W. B.” (New York)—“M. P.”—“F. M.”—“T. W.”—“Shareholder” (Van Consols) should attend the meeting next week—“Reader” (Glasgow): We could not publish such a letter without the writer's name being appended—“Veritas” (Bristol)—“S. C.” The matter will be attended to—“J. H. J.” (Grampound-road): A letter sent to the office will be forwarded to Mr. George Henwood—“Adventurer” (Redruth) had better send his letter to the person addressed—“Shareholder” (Wheatley): Refer to Mr. Ashmead's Table of Prices, which appears in another column.

## THE MINING JOURNAL,

Balway and Commercial Gazette.

LONDON, JULY 14, 1877.

### THE DURATION OF OUR IRONSTONE FIELDS.

On all hands it is admitted that the prosperity of the Coal Trade greatly depends on that of iron, the two combined having been the principal levers in raising England to her commercial greatness amongst the nations of the world. This was plainly shown a very few years ago, when both advanced in price at the same time, and almost to the same extent, whilst it was stated by those connected with both trades most extensively that the special manufacture which led to the demand for coal being for a time far beyond the power of producers to supply, and to the great advance in price, was the marked increase in the make of pig, and its conversion into bar and rolled iron generally, and steel, principally for the United States and the Continent. Ironstone is, then, the largest consumer of coal we have, taking it from its introduction to the blast-furnace through its various stages, until it is made into merchant iron, and steel of every description from the Bessemer rail to the watch spring. From the first process to the last it requires close upon one-third of all the coal raised in the United Kingdom. In 1872, certainly a buoy year, the quantity of coal used in the manufacture of pig alone was 21,000,000 tons, whilst nearly as much would go in the other processes. It is true, however, that the consumption of iron ore does not go on increasing from year to year in the same relative ratio as coal does, and it may, perhaps, be as well that it does not increase so much, at least with our present somewhat limited knowledge as to the extent of our supplies at home, for we are certainly not aware of any official attention worth speaking of having been paid as to our available stores. At the present time our iron ores are plentiful and cheap, and in all probability will continue to be so, but despite such advantage we consider that were our information with respect to the probable duration of our stores of them more definite and reliable than what it now is, it could not be otherwise than both valuable and interesting. In importance to all classes in the country our products drawn from ironstone cannot be overrated, being scarcely second in that respect to coal, of which we know so much, owing, in a great measure, to the vaticinations made a few years since by some gentlemen with respect to the time when our supplies of it would be exhausted, and to the variety of opinions that prevailed on the subject by our ablest geologists.

It was owing to these diverse views on a matter of the gravest character to the future of the country that we had the Royal Commission appointed by her Majesty to enquire into the coal resources of Great Britain and matters connected with the consumption of coal. On that occasion evidence was given by the ablest experts in the kingdom on the question. But the Commission went further, and appointed the most eminent geologists and mining engineers we have had to investigate the extent of the various coal fields in the kingdom. The result was the production of able and exhaustive tabulated reports, giving the calculated quantities of coal down to a depth of 4000 ft. from the surface, both of the visible and concealed coal fields in Great Britain and Ireland, from all workable seams of 12 in. and upwards. Now, if such valuable information can be obtained concerning coal, surely there ought to be less difficulty in obtaining similar returns relating to ironstone, the annual yield of which is little more than one-tenth of the former. We might then have side by side valuable statistics showing the probable time when our known stores of coal and ironstone would be getting exhausted. The question of the probable exhaustion of our coal fields has been a favorite one with many eminent men, but very few indeed appear to have paid similar attention to iron ore, which we should say is even less complicated. So far as we can judge, there are reliable data to go upon, so as to say whether in some of our most important districts the coal or the ironstone will be first worked out. It would appear, however, that Mr. ISAAC LOWTHIAN BELL, one of our highest authorities, has had the subject in his mind, for, when giving his evidence before the Select Committee on coal, he said—“As a matter of curiosity, I may state that I made a calculation one day, and I made out that it would take the whole of the coal of the counties of Northumberland and Durham to smelt the ironstone in the Cleveland hills—that is, supposing all were used for making iron alone, but our coal fields will be exhausted long before the iron field is.” This is an important item in itself, seeing that Cleveland is the most extensive field we have, raising more than one-third of all the ore smelted in the kingdom.

But there are other districts where the coal and the iron are close together, the extent of which it is most desirable should be known—such, for instance, as those in Cumberland and Lancashire, where the valuable deposits of fine hematites are so well suited to converting into Bessemer. There are also other localities where coal is extensively raised and iron produced, but where the ore is becoming exhausted. This would appear to be the case in South Wales, where the quantity in that part of the Principality and Monmouthshire fell off from 1,247,594 tons in 1872 to 495,510 tons in 1875. But in South Wales it may be said that the lower coal measures are the chief repositories of the ironstone, and in some places are not more than 5 in. in thickness. The consequence is that large quantities of ore have to be imported from Northamptonshire and other districts. In some other localities where there is also coal the production of ironstone has been very far below what is required for the furnaces, and this is particularly the case with respect to Derbyshire, which imports more from Northamptonshire

than is raised within its own limits. The blackband ironstones of the Clyde coal basin that have done so much for developing the mineral wealth of Scotland were discovered by DAVID MUSSET at the commencement of the present century, but are now nearly worked out, so that of late years there has been a considerable falling off in the quantity raised, the difference in three years having been no less than 827,745 tons, or more than 25 per cent. North Wales contains several fields of hematite and other qualities of ore, but they do not appear to be much known or worked, for the quantity raised is considerably below the output of pig made.

Coming to the ironstone fields that are at a considerable distance from the coal districts, our information with respect to them is even less than those that we have previously alluded to. The most important of these is that of Northamptonshire, extending in one direction in an almost straight line for something like 40 miles, in some places there being a thickness of 30 ft. of stone, giving 40 per cent. of metallic iron. How far the beds extend we are unable to say, but they evidently go into the adjoining county of Rutland, and in all probability join the ores of Lincolnshire, to which they are in every way similar. In some parts of the county of Northampton within a very few years the roads were mended and walls built with ironstone, and the *Mining Journal* was the first and only paper that drew public attention to the vast mineral resources that were lying waste over a large area of ground, a fact that has been fully acknowledged by the leading ironmasters, and also in a recent history of Northamptonshire. The increase in the production of the county was more rapid than in any other part of the kingdom, for in six years the output had gone up from 476,981 tons to 1,004,093 tons. Yet, as we have before stated, our knowledge as to the entire area of this important ironstone field is almost nil, all we know being the different localities where the stone is now being worked, and that it is extensively used in the furnaces in Derbyshire and South Wales in addition to the home ones. The next iron district in size is Lincolnshire, which in the northern part commences at Frodingham, and goes on to Brigg, ore being raised at Claxby, close to Lincoln, but little, indeed, is known as to where the boundaries are that divide the ironstone from other strata, and here there is also plenty of room for profitable investigation. In Cornwall and Devonshire there are good hematite and spathose ores, but the output is but trifling, not half even of what it was few years ago.

In Ireland there are beds of ironstone of good quality, but they are not worked to anything like the extent they ought to be. In the northern group of coal fields, in Leitrim, the clay ironstones occur both amongst the shales of the coal measure and amongst those of the Yoredale beds, and are very valuable from the quantity and richness of the iron. They were formerly smelted at the Arigna Ironworks on the shores of Lough Allen, and gave on an average 51.36 per cent. of protoxide of iron, 1.59 lime, and 1.92 magnesia. In the Antrim coal series the strata appear to be nearly identical with those of the Ayrshire and Lanarkshire coal fields, there being beds of the blackband limestone, which has been extensively raised and calcined on the spot and exported to the furnaces on the opposite coast of Ayrshire.

Without entering into further details, we think we have shown what a very imperfect knowledge exists as to the mineral resources of the country so far as iron ore is concerned, and how important it is in the public interest that our information with respect to it should be something on a par with what we know of our stores of coal through the labours of the eminent geologists and mining engineers whose calculations we noticed in the early part of this article. The work we do not believe would be so arduous as that was, and then we should know how we were situated with respect to the two most important industries of the kingdom.

### STRIKES, AND FOREIGN COMPETITION.

Although in several of the most important iron and coal producing districts there are not wanting signs of a gradual revival of the staple industries of the country, it is to the true interests of all classes that we should occasionally review our position, and endeavour if possible to ascertain our future prospects. And in doing so we repudiate any desire to take a gloomy or pessimist view. We have ever spoken cheerfully and hopefully of our country in a manufacturing and commercial point of view; we have the firmest faith in the stability and excellence of our workmanship, and the energy, perseverance, and wealth of our merchants and capitalists, and believe that side by side with any foreign competition English goods and manufactures will bear favourable comparison. But it is in this fancied strength of our position in which lies our weakness. Our hitherto superior position as a producing and manufacturing nation leads our working classes generally to view with indifference the rapid growth and development of those manufactures and industries in other countries who now keenly compete with us in the world's supply. Our working classes ignore the skill, ingenuity, and praiseworthy thrift of our Continental and American rivals in trade and manufacture, and view with the most stupid indifference many things which their best interests should lead them to calmly consider and reflect upon, and thus improve an remedy.

But it can scarcely be expected that our working classes will lay these things to heart so long as they are led by those who, however good their intentions, are ignorant of the matters upon which they treat, or wilfully perverse in the action they follow. Mr. MACDONALD, M.P., in his recent address to the miners of Hanley on the subject of Trades Unions, made several sensible and pertinent observations to which no one could justly take exception; but he made other remarks with which we altogether differ, knowing them to be contrary to fact and most inimical to the true interests of the country. Mr. MACDONALD is justified in attributing much of the present improved condition of the collier and of the working classes generally to Trades Unions or combinations, but even here the growth of education and justice between man and man have materially contributed to bettering the condition of our colliers and mechanics. But when Mr. MACDONALD denounced “the fear of foreign competition as simply a bug-bear invented by greedy employers to help them to grind down their workpeople,” then we at once join issue with him, and unhesitatingly say that he either ignorantly or wilfully perverts facts which should be patent to all, more especially to those who attempt to lead others. We are seriously afraid that Mr. MACDONALD purchases popularity with the working classes at the expense of responsibility. It is unfortunately too easy to obtain applause in a crowded meeting of uneducated colliers at the expense of the employers, but we envy not the popularity so earned, or the plaudits of such a populace. Why will Mr. MACDONALD ignore official facts and figures, convincing to other minds, and repudiate evidence of an overwhelming character?

Is it not a fact that England to-day is driven out of the markets of which she a few years ago possessed an almost complete monopoly? Is not Germany, and France, and America keenly competing with us in our iron and steel works, our iron hardware, and many of our staple productions? No matter what the cause, the fact remains patent to all who are not persistently blind or wilfully ignorant. Strikes, and the suicidal policy of the leaders of Trades Unions, in insisting upon ever increasing wages, have produced in this country a state of things which it is unwise and impolitic to attempt to ignore or under-estimate. The demand for high wages, and the refusal of the working classes to abate one jot or tittle of their-fir-fights and privileges, have given immense advantages to the mechanics and artisans of other countries, which they have not been slow to avail themselves of, and foreign workmen now stand shoulder to shoulder with our best English mechanics and artisan in the production of articles in which we once held supreme sway, and our merchants find it increasingly difficult to place English goods in foreign markets where only a few years since they were appreciated and sought after. Mr. MACDONALD's reservation that it is “utterly impossible for America to touch us in the markets of the world,” simply stands for nothing in the face of stern facts and realities. Manufacturers and merchants know too well by painful experience that the United States are rapidly superseding us, not only in foreign markets, but in many of our own colonies, more especially in Australia and Canada. We say these facts are known, or should be known, by Mr. MACDONALD, as a

leader of the working classes, and he has a heavy and serious responsibility resting upon him in withholding these truths, and dulling our mechanics and artisans into a state of false security.

A successful diagnosis of disease is the surest way to a remedy, for experienced in the commercial history of the present generation. Let us have a clear perception of the reason and we may say advisedly that strikes are at the bottom of our present trade depression and commercial stagnation; and we also say, notwithstanding the assertion of Mr. MACDONALD, that England, as a manufacturing nation, cannot afford to treat foreign competition as a “bugbear.” Strikes must in future be discountenanced, and our working classes must treat as stern facts and realities the severe competition of other nations in our manufactures and arts, and when all shall have learnt to disregard the voice of the charmer in the shape of the counsels of the Trade Unionists, and realize our true position as having determined rivals with whom to contend, then, and then only, may we expect to find our trade and commerce once more firmly re-established.

### IMPROVEMENTS IN THE WORKING OF COAL.

The frequent accidents that take place in our collieries from the use of gunpowder have led to its entire discontinuance in many districts where the mines are known to be fiery, and to the adoption of various methods for taking its place. Some of these have been successful, whilst others have not been persevered with. By the ordinary method of getting the seam is undercut by the miner, and by one system it either falls by its own weight, or is forced down by the superincumbent strata above it. By another method the hole is made above the coal, and is blown down with powder, two or three holes being drilled, and the cartridges with fuses properly rammed in and ignited the coal is brought down. But this in many collieries where inflammable gas prevails is an element of danger, so that the coal in those cases where powder is not used is caused to fall by means of wedges driven in by hand with hammers. This is a tedious and expensive process, and to the disadvantage of the workman and also the employer. In some districts, such as most of those in South Wales where the steam coal was so friable that after being cut and left standing idle for 12 or 16 hours it came down by the pressure of the roof. But in mines where the coal requires considerable force to fall to the bottom, and where gunpowder is considered dangerous, means have been brought forward by which all that is required can be accomplished by hydraulic machinery.

One of the first that introduced this system was Mr. JONES, of Blaina, and it has been in operation at several places, but was at first intended to be worked in connection with a coal-cutting machine; it is simplicity itself. After a head was cut in each side, and nicked vertically in the middle, a bore-hole was made. Into the bore-hole was fitted a disc of iron fitted with a cup leather, forming a hydraulic ram. To the hollow disc or cylinder a pipe was attached, serving as a handle, so as to insert it into the nick, whilst the handle was continued by means of a flexible pipe to a fore-pump, drawing its water from an air-tight reservoir, and worked by one man. By the action of the hydraulic ram the coal was broken from the solid, the air-tight reservoir serving to draw the water back from the ram cylinder on the completion of the stroke, and so pulling the ram into its place, enabling the same water to be used over again.

Mr. CHUBB, of London, also brought out a similar machine, as did also Mr. BIDDER. These machines, instead of being inserted into a nick, are made to go into an ordinary hole. By means of a hydraulic press a wedge is driven between two blocks of steel with a lateral movement only, by means of tension bars connecting them with the press. There is another system, in addition to the wedge machine, by the same party. Rams are introduced, and holes are made for cylinders in connection with them, with a solid bar of steel. At one end of the bar is screwed a tube 23 in. in diameter and 17 in. long, on to the end of which was fixed one of TANGYE's force-pumps. The water from the pump was carried through a copper tube with a small bore, and is screwed into the bar carrying the rams, which are on both sides of the bar. By working the pump the rams on either side are forced out from the bar. By means of the pump one man could apply a pressure equal to about 10 tons on the square inch.

Mr. BIDDER's system is a very good one, the arrangement of the wedges being such that any desired degree of expansion can be obtained.

Instead of forcing one solid wedge between the pressing block, two wedges laid side by side are forced in, and if more expansion is desired the ram can be drawn back, the mass removed, and the point of another wedge inserted between the heads of the split wedge, the press then re-attached, and a second wedge forced in, and the operation can be repeated as often as necessary. The machine of Mr. BIDDER has been extensively used in Staffordshire and Lancashire, and, no doubt, will be more so, seeing that both men and masters are in favour of not using powder in mines where a good deal of gas is given off.

Mr. C. BARTHOLOMEW, one of the proprietors of the Wombwell Main Colliery, and of the Swithland and Elmwood Main Collieries, near Barnsley, is another patentee for improvements in the working of coal by means of a hydraulic press or screw jack. The system can be applied either with or without undercutting the bottom or cutting the sides. One mode by which the coal can be broken is by drilling a hole into the face of the coal, which is enlarged by means of a bar or rod with a cutter pointed to its end. The back of the cutter is made so that when it touches or is pushed against the end of the hole the cutter crosses or is forced out sideways, and the bar being pushed firmly in and turned round the end of the hole is enlarged. The hole being ready a tube is inserted with a small ring, which fills, or nearly so, the diameter of the hole. The space between the tube and the side being rammed firmly in with damp coal dust and made as solid as possible. The pipe is then connected with the pump of a hydraulic press, or with pipes supplied with water from the pit top, when the force is brought to bear on the coal; the requisite force to bring down the coal of course depending upon the compactness of the coal, its being more or less full of gas or water, or whether it has been disturbed or not by the superincumbent pressure of the ground.

The latest addition to the various systems introduced for the purpose of breaking coal *in situ* is that just brought out by Mr. JOSEPH MITCHELL, Worsbrough-lake, near Barnsley, who is interested in the Edmunds and Swithland Collieries, as well as in the Mitchell Main. In the two former there was a lengthy strike on the part of the men with respect to the price paid for getting coal without the use of powder, for after the explosion at Swithland the men and their employers agreed to give up gunpowder altogether. Consequently the wedging had to be done by hand, a very slow process indeed. Since then Mr. MITCHELL has paid a good deal of attention to the subject, and being both a mining and a mechanical engineer of long experience, he has had a great advantage over most of those who have preceded him in the same direction. The result is that he has invented a mode which gives every promise of the most complete success. The invention consists of an expanding plug of a cylindrical form worked by means of hydraulic pressure. The plug is composed of two halves, with a little wedged-shaped space between them, and are jointed at the end to the extremity of a hydraulic cylinder, and receive between them a wedge-shaped extension of the hydraulic ram or plunger, fitting exactly the widest part of the wedge-shaped space, and extending about half its length when the ram is withdrawn into the hydraulic cylinder. When the pressure is applied to the ram the wedge-shaped extension is driven further along the space between the two halves of the plug which are forced apart, so that the plug is expanded in one direction beyond its original diameter. As usual the coal is undercut in the ordinary way, when a hole is drilled in the face of it corresponding to the size of the plug in its contracted form into which is inserted the plug, so that the expanding force will be exerted in a vertical direction, and the hydraulic power being applied the wedge-shaped extension of the ram is driven between the parts of the plug, thereby expanding the latter with great force until the mass of coal beneath

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it is brought down. A number of these expanding plugs may be simultaneously applied if necessary, or the same plug may be inserted successively in different holes. The hydraulic power may be introduced in the ordinary way by an accumulator, or by some other source of power in connection with the hydraulic cylinder, or the power may be generated within the cylinder itself by the evolution of gases produced by the chemical combination of a suitable mixture placed within the cylinder, the expansive force of the gases being exerted on the liquid, and by it transmitted to the ram. By this mode of working the men have plenty of time to retire to a safe distance before the fall of coal takes place, which is not always the case by ordinary wedging, for it is from such falls that so many fatal accidents take place.

Hydraulic power is not only the most economical mode of bringing down the coal when it is undercut, but it is the safest as well. Not only so, but it also brings it down in much larger pieces than powder or hand wedging, so adding to its marketable value—a matter of great importance to the colliery-owner and the collier as well. As we have before stated, the doing away with powder in many mines is going on, and will continue to do so, and in its place we certainly cannot see any better substitute than the hydraulic power in connection with wedges and plugs, to which we have drawn attention.

#### EXPERIENCES OF AN IRON "LIMITED."

The experience acquired from year to year by the Rhymney Iron Company (Limited) continues to be of the most dismal character. More capital has been put into the concern, the manufacture of steel has been proposed, and every effort has been made to improve the situation, but all to no purpose, as the shareholders still go dividends. The company has certainly still a good balance at the credit of its profit and loss account, but in the last financial year its operations were attended with a loss of £7332. In December, 1876, the directors issued a circular, in which they expressed their opinion that, although the condition of trade was very unfavourable, the company would pass through the year without loss; but in consequence of a seriously protracted opposition on the part of a section of the colliers to a fair adjustment of wages, and of the prejudicial influence of the war upon the demand for railway iron, their expectations have not been realised. The production of iron by the company last year amounted to 47,700 tons, against 30,404 tons in the preceding nine months; there was thus some return last year to the full output of the mills, but the quantity of iron made in 1876-77 still fell somewhat short of the quantity required for the most economical working. In regard to coal, no alteration in the demand has warranted the resumption of the full working of the company's collieries, and the directors still adhere to the opinion that it is to the true interest of the company to restrict the output of steam coal for sale as far as practicable. The application of mechanical haulage has been completed in the principal pit, and screens have been erected as a substitute for the division of the coal by hand labour; the new process is stated to be working satisfactorily. The anticipations entertained by the directors of an increased supply of Spanish iron ore at reduced prices have also been realised. All this is encouraging as far as it goes; but, on the other hand, the condition of the iron trade has been adverse, and the supply of orders has been irregular, the price falling from 6d. per ton in March, 1876, to as low as 5d. per ton, rallying for a time to 5d. 15s. per ton, and then exhibiting a second relapse. Taking all the circumstances into account, no previous period has exhibited so unfavourable a contrast between the cost and the sale price, and its effect has been illustrated by a suspension of operations in several important ironworks in the country. Debentures to the amount of 70,000l. have been fully subscribed for, the amount having been taken up without any appeal to the public. The Bessemer steelworks, for which this new capital was principally raised, have made fair progress, although they have been retarded by an unusually wet season.

The great drawbacks against which the Rhymney Iron Company (Limited) has had to contend have been—first, the loss of the American demand for our railway iron; and, secondly—and probably by consequence—the sadly low rates current for iron. The directors of the Rhymney Iron Company (Limited) assure the proprietors that they are giving their earnest attention to economy in carrying on the company's works; but the effect of this assurance is, unfortunately, almost entirely neutralised by the intimation which the directors have in the next breath to make—that there are at present no indications of any improvement in the demand either for iron or steel. The iron trade has been run down in the United States—as we have shown on more than one previous occasion—to terribly low prices; and until some rally takes place on the other side of the Atlantic we cannot hope for any very material improvement in the British iron markets. All this is trying enough, but during the last three years the Rhymney Iron Company (Limited) has had, like its neighbours, to face the still graver difficulties of disorganised labour markets and chaotic quotations for raw materials.

LOCOMOTIVES IN COLLIERIES.—A telegram to the Times from Philadelphia (July 12) says—"In a coal mine near Sharon, in North-Western Pennsylvania, where the coal is brought out by locomotive power, anthracite was being burnt in the engine on Wednesday, and the result was that the air passages of the mine became filled with gas while 33 persons were at work in it. Rescuing parties were as soon as possible sent in, and they succeeded in bringing out all the victims, but seven were already dead and others injured."

THE PRUSSIAN IRON AND STEEL INDUSTRIES.—The Berlin Statistical Bureau has completed its labours on the Prussian industrial census of Dec. 1, 1875. The National Zeitung quotes the figures relating to the iron and steel trades as of special interest in connection with the existing agitation for the protection of these trades. The total number of establishments for getting the ore, smelting, and steel making is 1678, of which 1073 have a personnel numbering upwards of five, and 605 a staff of less than five. These industries give employment in all to 114,000 persons. The number of persons engaged in working the iron and steel is 215,000, distributed amongst 91,000 establishments, of which 88,500 employ less than five persons and 2445 more than five. The quoted journal remarks that the importance and comprehensiveness of this account of Prussian industry ought not to be depreciated, and adds that the protectionists who are crying out for a special commission of enquiry will perhaps be interested to learn that the industrial census of Prussia alone has cost 180,000 marks (9000l.), in addition to the salaries of the regular employees of the Statistical Bureau.

GOLD IN AUSTRALIA.—South Australian papers announce news of an encouraging character received from the Northern Territory gold fields. The reefs are rapidly improving, and the deeper the mines are sunk the richer they become. Some coolies working on tribute are making 25s. per man per week.

COAL AND IRON IN THE UNITED STATES.—There has been no change in the price of steel rails at Philadelphia, and the market may be stated to be quiet and steady. Sales have been made of about 5000 tons at medium figures during the last few days. Prices have ruled at \$16 to \$18 per ton currency at the mills. There have been several enquiries for steel rails at Philadelphia, one being from a foreign buyer, and it is possible that some important orders will be placed during the next month. There are several buyers of iron rails in the market at Philadelphia, and it seems probable that an increased business will be developed in the course of a few weeks: sales have been made on account of a Cuban line. There has been a moderate demand for plate and tank iron at Philadelphia, but scarcely any large orders have been placed. There has been a rather more active demand for old rails in Pennsylvania lately. The Pennsylvania pig-iron trade has remained without any signs of improvement. In the Pittsburgh district the manufactured iron trade has continued dull, with little prospect of any improvement. The coal and coke trades of Pennsylvania have also been dull. The aggregate production of anthracite and bituminous coal in Pennsylvania to June 15 this year amounted to 10,918,448 tons, against

8,504,059 tons in the corresponding period of 1876, showing an increase of 2,542,384 tons this year. The aggregate movement of coal and coke over the Pennsylvania Railroad to June 7 this year amounted to 3,062,548 tons, of which 1,672,652 tons were coal. The Little Rock and Fort Smith Railway Company contemplates the working of coal at various points along its line.

#### REPORT FROM CORNWALL.

July 12.—These are dull times indeed, and but for the West Basset business there would be very little to talk about. This still remains the chief topic of conversation in mining circles, so that it has been something more than a nine-days wonder. The alarm which was felt with regard to the position of other mines, which was somewhat freely canvassed, has subsided, and probably the lesson will do some good. The comments that have been made adversely to the declaration of a dividend at Dolcoath seem to us to be idle. The profit was made in the three months' working, and there is no reason whatever why it should not be divided. But some people do lose their heads terribly over mining business.

It remains to be seen what effect the unfortunate death of Mr. Greene will have on the fortunes of Penstruthal. There is very little doubt that this is a good mine, but whether it is not over-weighted with capital is another matter. This is, probably, the most promising of Mr. Greene's recent ventures.

There has been a strike at Levant. It did not last long, the miners wisely coming to the conclusion that it was better to submit to a reduction in the rate of wages than to be thrown out of employment. If mines are to be kept afloat now-a-days—rare in very exceptional instances—their expenses must be reduced to a minimum, and wages, to a certain extent, must share in the general economy. The managers at Levant seem to have acted with every consideration.

A well-known figure in mining circles has passed away—Mr. Hugh Sims, so many years clerk and cashier to the Messrs. Williams, of Scorrier, aged 77 years. He was as much respected as he was widely known.

The rock-drill competition will be a sharp one. The Barrow people are by no means inclined to let the Diamonds have it all their own way, and so we are told that proportionately the Barrow drives faster than the Diamond. It is, however, early days yet to compare notes. The chief point in which mining men are interested at present is this—that further proof has been afforded of the applicability of mechanical boring to Cornish mines. It has been shown that the Barrow works efficiently and economically at Dolcoath; it is being shown that the Diamond Company's drill will work efficiently and economically at Carn Brea. So here are two strings to the mining bow.

The great adit is not an unmixed blessing. During the heavy rains of last year the dam that confined and carried away in a separate channel the mud and other waters brought by the adit to Carnon broke just above Devoran, when some thousands of tons of sand were thrown into the river, which had done great injury to the navigation. Vessels that formerly came to the quay to discharge have now to be lightened some 40 or 50 tons at Restronguet, and vessels that took away formerly from 130 to 150 tons of copper ore have now to go away with only 80 or 90 tons, owing to the silting up of the river. Others have to seek cargoes elsewhere, and go away in ballast, there being nothing in the place to ship, in consequence of the falling off in the trade of the neighbourhood. A great alteration has taken place at Devoran during the past 12 or 13 years. Then there were more shipping transactions done in one month than now in twelve. Formerly upwards of 20 vessels were to be seen at the quay at once, and three or four steamships regularly called once or twice a week throughout the year. Now they have sought trade elsewhere, partly owing to the state of the river, and partly to the depressed state of things in the mining districts. The quantity of debris that has been brought down into some of our valleys from clayworks and mines is enormous.

The Duchy is a grand obstacle. Perhaps it will interfere with the improvement of the river at Devoran. It actually has with the dredging operations in Falmouth Harbour, for at a special meeting of the commissioners a letter was read from the Duchy authorities which stated that observing from the newspaper reports that dredging had for some time past been going on in Falmouth Harbour, of which they were unaware, and that the omission to ask the consent of the Duchy for permission to proceed with the works appeared to have been designed, the matter had been brought under the notice of the Council of the Prince of Wales, and that the harbour commissioners would not be allowed to continue their operations until they obtained permission from the Duchy. It was alleged that dredging had been carried on off Kilk's Quay nearly 40 years since in Falmouth Harbour, and after some discussion it was resolved that until the commissioners are assured they were legally liable to ask the Duchy's consent, they decline to do so. Well done Falmouth! Now the Duchy asks for a rent of 1s. a year as an acknowledgment.

#### REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

July 12.—This week has seen the closing of one memorable trade quarter and the opening of another. The last has been one of little business and less profit; what the new quarter will be the quarter itself will alone declare. That it will be a time of unalloyed prosperity war and unsettled relations between employers and employed make unlikely. Knowing that the colliers have to be settled with before the current quarter is out buyers of coal and of iron already evince a disposition to operate with much caution. What, however, the preliminary negotiations which are about to take place touching the future scale of wages will evolve is wholly doubtful. At present the miners' representatives give no sign of any preparedness to meet masters' views in respect of lengthened hours. Consequently trade is getting but little relief from that quarter, though the distress amongst the colliers' families is very severe; in truth it is without precedent in summer.

The Quarterly Meetings yesterday in Wolverhampton and to-day in Birmingham have passed off very quietly. More was, however, done in several commodities than some salesmen had expected, and yet more would certainly have been recorded if lower prices had been taken, but the circumstances of the trade wholly precluded any declared reduction upon the standard quotations which have now for some time prevailed for best finished iron. Among the novelties exhibited were models of the Universal iron colliery wagon, shown by Messrs. Johnson, Cookson, and Co., of Dudley; diagrams of Whitwell's patent fire-brick hot-blast stove; working specimens of Pumphrey's patent fiftyfold writer, and of the magnetic pen. The advantages claimed for the new colliery wagon are lightness, simplicity of construction, saving of labour in greasing, saving of grease, perfect lubrication, easy running, and cheapness.

The pig market was taken greatly by surprise this afternoon at the Lilleshall Company announcing that they should take 10s. off cold-blast and 5s. off hot-blast pigs, making cold-blast 5s. and hot-blast 4s. per ton. Staffordshire all-mine was subsequently dropped 5s. making them 4s.; marked bars were declared unaltered, but Monmouth marked iron was dropped 10s. Some other firms must follow. Ironmasters are now looking for some slight relief in the matter of mill and forgemen's wages, even as they with the coal-masters look for the adoption of a new scale of miners' wages which shall help to bring down the price of coal and of most descriptions of pig-iron. Until this relief is experienced the bulk of the makers of finished iron over their inability to accept the prices at which some buyers declare they can alone place orders. This leads to the extent of new business doing this week being very small as well at the blast-furnaces as at the mills and forges. Still as to both orders have been booked for delivery throughout the quarter at the rates now current. It would, however, be inaccurate to state that these represent a total equal to the average at this season.

Mining and ironworks property keeps at a discount. Shares are increasingly difficult to sell even at weakening quotations, and when, likewise, there can be no doubt of the property ultimately yielding, in respect of coal mines, vast stores of high-class fuel. The recent addition to the capital of the Sandwell Park Company has had the anticipated effect upon the shares of that company, and they are

now easy to get in varied parcels. For the old 10s. shares there are buyers at 16s. and sellers at 18s., for the new there have been sales at 2 premium, while "fraction thirds" of the new shares stand at 1½ premium buyers, and 1 premium sellers. The Pelsall Coal and Iron shares stand at 11½ dis. buyers and 10½ dis. sellers for the 20s. shares (15s. paid). There are offers of 3s. 10s. for the 10s. Chilington Iron Company's shares, but no sellers at that figure, and the 10s. (8s. 10s. paid) shares of the Spon Lane Colliery are offered in vain at 6 dis.

The previous quiet demand for coal in North Staffordshire has not been made less so by the diminished enquiry, consequent upon the local holidays, for the requirements of the ironworks have not been increased. Under these circumstances there is a tendency to weakness in the coal quotations in North Staffordshire. Pottery mine is selling only slowly, there being a marked falling off in the business only recently and for some time before doing with South Staffordshire. The finished ironworks can be kept in only partial employment. Plates are difficult to sell at a paying rate, so considerable is the competition from Cleveland; the same has to be said of bars, though in these a fair business is here and there being done via Liverpool; and in strips and hoops the competition of Warrington is much felt. There has scarcely ever been so quiet a quarterly meeting as that which was held on Thursday last week. Hardly anything was done, and it was by general consent that transactions were deferred till after to-day's meeting in Birmingham.

#### REPORT FROM DERBYSHIRE AND YORKSHIRE.

July 12.—Very little change has taken place in the state of the iron and coal trades since my last, both being still quiet. The same is also the case with respect to lead-mining, the production of ore being little more than one half of what it was a few years since. At the works engaged in the smelting of ironstone there is about the same production of pig, for which a large quantity of ore is still imported from Northamptonshire. In manufactured iron a steady business continues to be done, and the same may be said with respect to Bessemer rails at the one establishment of which the county can boast. The collieries have not been fully employed for some time, except in a few instances; and this state of things is not likely to be materially altered, seeing that the demand for household qualities is likely to decrease more than otherwise. This is more especially the case with respect to the trade with the Metropolis, which has fallen off considerably of late. There are still a good many miners out on strike at Unstone and other places against proposed changes in the price paid for getting. It is, however, probable that a general reduction of wages will take place should the price of coal fall lower than what it now is. On Monday last there was a meeting in Sheffield of the Associated Coal-owners, when the question was discussed, when it was agreed that it was not at present desirable to disturb the existing relations between the masters and men.

One or two branches of the Sheffield Trade has slightly improved during the week, but the general tone is far from healthy. The colonies continue to be amongst our best customers, whilst some fair orders are in hand for rails and railway material. Several of our manufacturers are exhibitors at the agricultural show at Liverpool. Amongst them is the well-known firm of Crowley and Son, the largest producers of malleable iron there are in the kingdom, and whose fine castings, either plain or ornamental, have a worldwide reputation, equaling in sharpness, finish, and elaboration anything that can be produced in copper or steel. Their exhibits consist in chaff-cutters and lawn-mowers, neither of which for cheapness, simplicity, and easy working can be equalled, let alone surpassed. Messrs. Newton, Chambers, and Co., of the Thorncliffe Works, also show fine specimens of kitchen ranges, for which the firm is noted.

The Coal Trade of South Yorkshire is still quiet so far as regards household sorts, but there is a reasonable demand for steam qualities for shipment from the Humber ports. The wages question in the district is by no means satisfactory, and it is said that to-day a notice was posted at the Dodworth Silkstone Company's pits stating that the whole of the men would receive the usual 14 days' notice to leave. Seeing that many of the men are now on strike it is evident that it is intended that there shall be a general reduction in the wages paid to all the hands.

#### REPORT FROM THE NORTH OF ENGLAND.

July 12.—The usual third quarterly meeting of the iron and allied trades of the North of England was held at Middlesbrough on Tuesday. There was not much business done, however, owing to the singularly depressed state in which the pig-iron department of the staple industry has been for some time past. Buyers of pig-iron are disinclined to enter into business, and stand out for even lower quotations than those now current, although these are about as low as anything that has been known in the history of the trade. Business, therefore, was done at even lower quotations than those recently current, No. 3 being quoted at 4ls., and No. 4 forge at 39s. 6d. per ton net. In some cases the merchants in Cleveland have expressed themselves as greatly dissatisfied with the new rule introduced by makers, which compels all iron to be paid for on delivery, instead of at the end of the month or by bill, as previously. There is not, however, the least reason to doubt that this arrangement will, in the long run, tend to the greater stability of the trade, and prevent some of those disastrous and unexpected losses that have recently been so common throughout the Cleveland district. Prices are kept down by the exceptional largeness of the stocks in the hands of pig-iron makers. At the end of the month these stocks represented 25,613 tons of iron, in addition to which over 20,000 tons were at the same time in warrant stores. It is, of course, impossible to foresee how this state of things may continue to affect the trade. The probability, however, and the view entertained by the most experienced men is that, now the present year has so far advanced, there will be no radical change of affairs, at least, before next spring, when, if war in Europe should have terminated, a steady and permanent revival may follow upon the opening out of the ordinary spring navigation.

The usual exhibition of objects of interest to the trade was held on Tuesday, at Middlesbrough, in connection with the quarterly meeting. There was, however, very little disposition evinced to take advantage of the opportunity thus afforded for bringing under the notice of all classes of the industrial community "things new and old"; and, considering the limited degree of encouragement usually vouchsafed to exhibitors by those for whom they exhibit, the indifference referred to is, perhaps, not altogether a matter of surprise. An exception to the general rule was, however, afforded by Messrs. Bolekow, Vaughan, and Co., who showed some samples of steel made from Cleveland iron at their new Eston Works. These samples had been produced by running the molten iron direct from the blast furnaces to the Bessemer convertor, without the intermediate cupola process, as is done at the Barrow Hematite Iron-works, the Ebbw Vale Works, and elsewhere. The fracture was very good, and the steel showed to analysis 20 per cent. of carbon, 86 per cent. of manganese, 07 per cent. of silicon, and 1·77 per cent. of phosphorus. There cannot be a doubt that if the phosphorus could have been further reduced the quality of the metal would have been much better. Phosphorus, however, is extremely difficult to eliminate, and it is greatly to be feared that until some new and more effectual process for reducing its proportion is found the steel made from Cleveland iron will not be of sufficient value to bring it into general use as a marketable commodity. Messrs. Bolekow and Vaughan have now, however, attempted to solve the problem; and in the interests of the Cleveland district it is to be hoped that their efforts will be successful.

Another interesting exhibit, and one that may be regarded as marking a new era in the metallurgy of the Cleveland district, was that of specimens of charcoal iron of very high quality, made by the direct process, with which the name of Dr. Siemens is associated, from Cleveland ores. The iron was shown by the Tewkesbury Company (Limited), and it was generally allowed to prove that iron of the best quality from the coarse and silicious ores of Cleveland is a possible thing. This, of course, is a matter apart from

the cost of the manufacture. On this head very little information is yet available, but the Towcester Company maintain that the cost of producing such iron from Cleveland ore is so low as to enable the iron to be successfully introduced into the market. We shall, probably, hear more of this matter. Meantime, it is interesting to find that practical men are persevering with costly and laborious experiments calculated and intended to lead to new economies in the wide field of practical metallurgy.

The standing committee of the board of arbitration and conciliation in the North of England Iron Trade will meet at Darlington to-morrow, for the purpose of arranging the preliminaries for the forthcoming arbitration as to the 10 per cent. reduction of wages sought for by the employers. It is intended that the arbitration court shall sit at Darlington, on the Monday following. Mr. David Dale has accepted the office of sole arbitrator, with the approval of both sides. Mr. Dale acted for five years as Chairman of the board, and has acquired in that capacity a very considerable knowledge of the usages and principles of arbitration. He is now about to act at a critical time, but he has a remarkable insight into the requirements of the trade, and in his hands there is little need to fear for the future of the board, the disruption of which has been threatened by the present claim of the employers.

Messrs. Bolckow, Vaughan, and Company have undertaken the manufacture of spiegelisen at their Middlesbrough works, the product of the ores which they import from their own hematite iron mines at Bilbao, in Spain. Samples of this spiegelisen just analysed by Messrs. Pattinson and Stead, of Middlesbrough, show 21.038 per cent. of manganese, 0.442 per cent. of silicon and 0.122 per cent. of phosphorus. It will thus be seen that the quality of the product is very good, and its cheapness is a matter of considerable moment to the steel trade on the banks of the Tees.

Sir James Fitzjames Stephen, Q.C., has issued his award relative to the reduction of 6 per cent. claimed by the Durham coalowners from the wages of the cokemen in their employment. Sir James finds that there are no special circumstances distinguishing cokemen from the other surface labour by whom a reduction of 6 per cent. was recently accepted, and he, therefore, awards the full amount of the reduction claimed. The reduction will come into effect from the date of the award. The whole of the men employed both above and underground in connection with the Durham collieries have now suffered a reduction of wages varying from 5 to 7½ per cent. It is not expected that there will be any disturbance of the rate of wages now established for a long time to come. Practically it may be said that the normal wage-rate of 1871 has now been re-established throughout the whole of the county, and in some cases wages are now taking an even lower range than these.

#### REPORT FROM MONMOUTHSHIRE AND SOUTH WALES.

July 12.—Although the Iron Trade shows no improvement so far as prices are concerned, it is manifest that there is more business doing at the local works. The figures given below will go to prove that fact. No further notices to terminate contracts have been given since last report, but it is feared that a general reduction in wages is contemplated. Low wages certainly are now, but the men have themselves to blame to a certain extent, as their conduct in opposing the just demands of employers in times gone by helped to drive trade from the district. The clearances made during the week have been to the Baltic ports, Italy, and Egypt. A slight revival is apparent in the foreign demand for bars. A large parcel has been forwarded to Sweden, and smaller ones to Portugal. The Tin-Plate Trade is unaltered. Owing to the death of one of the partners the Caldicot Iron and Wire Works are announced for sale by public auction. The works are about a dozen miles from Newport. Very little alteration has taken place in the Coal Trade, but the relations between masters and men appear to be becoming settled on a more satisfactory basis. The Ogmore Valley and the Maesteg men have resolved to resume work at the 10 per cent. reduction until the end of the present month, when the old rate of wages will be given. The Bwlch colliers have also decided to recommence work, an arrangement of a satisfactory nature having been made. The strike of surface men at Mountain Ash is also at an end. The Aberdare and Plymouth colliers are still resolved upon leaving work at the end of the present month, and their fellow-workmen are equally determined upon supporting them in the coming struggle against the 10 per cent. reduction. Although the collieries, generally speaking, have been fairly well employed, during the week business has been characterised by dullness. Clearances have to a slight extent fallen off. For steam coal there is still a tolerably good demand, but house qualities are quiet; patent fuel is also dull.

During the month of June last Cardiff shipped 363,257 tons of coal foreign, against 305,884 tons in the corresponding month of last year; Newport, 59,164 tons, against 52,207 tons; Swansea, 59,867 tons, against 57,136 tons; and Llanelli, 4940 tons, against 9690 tons. Coastwise shipments were: Cardiff, 72,033 tons, compared with 76,027 tons; Newport, 71,515 tons, compared with 62,130 tons; Swansea, 23,211 tons, compared with 19,611 tons; and Llanelli, 11,268 tons, compared with 9753 tons. The quantity of patent fuel shipped last month was 10,296 tons from Cardiff, against 3142 tons in the same month of last year; Swansea, 11,344 tons, against 19,628 tons. The iron cleared was as follows: Cardiff, 16,049 tons, compared with 6022 tons; Newport, 17,468 tons, compared with 11,947 tons; Swansea, 252 tons, compared with 404 tons. The following principal clearances made will show the direction of the trade: Carlisle, 1100 tons; Cudliz, 1343 tons; Gothenburg, 4094 tons; Genoa, 870 tons; Lisbon, 930 tons; Malaga, 3554 tons; Montreal, 3786 tons; Norrkoping, 1134 tons; Quebec, 1048 tons; Rio Janeiro, 1210 tons; St. John's, 847 tons; Uddevalla, 1510 tons; Wallaroo, 700 tons; Bahia 1868 tons; Kurrachee, 2100 tons; Palermo, 655 tons; Goliham, 2540 tons; Wisberg, 678 tons rails.

In the House of Lords the case of Morgan v. Elford and Another, has been decided. The defendants were charged with conspiracy and fraud with regard to the sale and purchase of the Gwawr Cae Gurwen Colliery, Swansea. In giving judgment Lord O'Hagan remarked that the Bill was studded with allegations involving, if they be not true, the most unwarrantable slanders against the defendants, and he was bound to say, agreeing in that respect unreservedly with the Court of Appeal, that those scandalous allegations had been left unproven, or had been disproved absolutely. The Bill was dismissed with costs.

At the London Bankruptcy Court an interim injunction has been granted restraining Mr. Williams, a large creditor at Birmingham, from levying a distress on the Bury Port Smelting Works. The company owning the works, which are situated in Carmarthen, have liquidated, and the works were mortgaged to Mr. Williams. The Registrar made the order prayed for until the application to disclaim comes on.

The fireman of the Weig Fach Colliery, named Rees, was summoned before the Swansea magistrates on Saturday, for that, knowing the mine was dangerous by reason of the prevalence of gas, he did not, being the competent person appointed under the Act, inspect the mine with a locked safety-lamp, and did not make a true report of the condition of the mine, and that the workmen were allowed to work there. There was another charge against the defendant of not inspecting the mine and roadways known as No. 20 tophole with a lamp before the time the colliers commenced work. The defendant, on the advice of his solicitor (Mr. Robinson Smith), pleaded guilty, and he was ordered to pay a fine of 2/- and costs, or one month's imprisonment, in each case.

The manner in which the Lord Mayor and Welsh Miners' Fund Committee have distributed the fund at their disposal will certainly give general satisfaction, especially the recognition of the services rendered by Mr. T. E. Wales, the Government Inspector, Dr. H. N. Davies, and the medical men, engineers, and colliery agents who lent their aid; and the allotting of lump sums to the widows, rescued miners, and rescuers will be much more highly appreciated than any arrangement for giving them a small weekly pittance. The majority of those who will receive the award will be well able to turn it to their permanent advantage. The distaste which the rescued men have at present to return to the mines will soon wear off, and with the little fund placed at their disposal some of them at least will, no doubt, exert themselves to obtain such additional knowledge as will enable them to attain a good position as colliery

officers. It is gratifying to find that none of the rescued or rescuers are likely to suffer any permanent injury in health. The committee, after a most patient consideration of each case, voted for each of the three widows £50/-, and to the 10 orphans £30/- each, and for the other rescuers £10/- by £50/- to the three men saved after 18 hours imprisonment £30/- each, and to a boy similarly saved £50/- These sums the committee resolved to entrust, as far as the actual distribution went, to Mr. Talbot, M.P., and Mr. Vivian, M.P., the county representatives, and Mr. Forsyth, M.P., to Isaac Price and to William Bell, £50/- each was voted, and to J. W. Howell and Charles Oatridge £50/- each, to the two London divers £50/- each, and the Carpis diver £30/- to the 24 shift colliers, according to the time at work, £50/- to the 35 pumpmen, £21/- to the 37 carters, £50/- to the two carpenters, £20/- each; and the two nurses, £20/- each. Plate of the value of £50/-, suitably inscribed, was ordered to be presented both to Mr. Wales, Her Majesty's Inspector, and Dr. H. N. Davies, whose services throughout the disaster merited much praise; and testimonials varying in value were allotted to seven medical men, 27 engineers and colliery agents at the unanimous wish of the committee. An embazoned resolution of thanks was voted to the Rev. D. W. Williams, of Pontypridd, for his great efforts in the relief of the sufferers. The Lord Mayor undertook, at the committee's urgent desire, to proceed to Pontypridd on Friday, Aug. 3, and personally distribute the rewards to the miners. His lordship will during his visit be the guest of Mr. Hussey Vivian, M.P.

#### REPORT FROM THE FOREST OF DEAN.

July 12.—Since my last report the disturbing element of the district has been pretty well got over. We allude to the attempt to get a lower rate of percentage on wages at Crump Meadow Colliery than at the Forest pits generally. The attempt was made at Trafalgar, Lightmoor, and other places, but signally failed, as, rather than sink lower, the men generally were disposed to strike, wages being at present in many instances lower than in the prosperous times and high prices for coal. After a week's strike at Lightmoor, the Messrs. Crawshay and Sons consented for the men to resume work at previous wages, work to be ruled as to quantity by current trade. The matter at Trafalgar was not pushed to a strike; but the breach between the manager and workmen at East Slade Colliery has not been adjusted even yet. In fact, numbers of the men are gone in different directions, and are not likely to return, having obtained other kinds of labour. The breach is much to be regretted, as it not only dispersed many of the workmen, but is also likely to prove a serious injury to the proprietors of the colliery, for the reasons which we stated in a recent report. An attempt or two has been made to induce the men to go in to work again, but the success has been almost nil. The company, however, is trying to move in another direction, as an advertisement is out announcing the whole of the New Bowson plant for sale. Close upon 100,000/- was spent at that place without winning the coal, because, it is now said, the first managers and engineers who undertook the sinking did not understand what they were about, otherwise the coal could have been won at most two-thirds of the cost invested without any good results. This failure was a great injury to the district, as it created unjust prejudices against the locality, and cut off by anticipation a source of profit and prospective employment for a large number of men. Arguing from experience in dealing with other seams, the deep coal at the Bowson would be found to be of excellent quality, as the seams generally improve in quality as they descend towards the centre of the Forest coal basin. Let us hope that the next company will be wiser in devising and in executing their plan for winning the deep coal at the goal under the New Bowson plant.

The Iron Trade is still dull, but the Great Western Iron Company has advertised for plans and tenders for the erection of a third furnace at Sewdley, also stores at the same place, and for covering in the bank at Find All level. The Forest Vale Ironworks are under repair, so that little work is going on there at present. Work at most of the small collieries is reported as almost entirely suspended, as they do not pay except when prices rule high. Steam coal is in fair request, and a new beginning for procuring that class of coal has been made at Moseley, in West Dean. The laying in the water-mains at Cinderford, Littledean Hill, Steam Mill, &c., is progressing rapidly, the contractor properly judging that fine weather and long days are the most advantageous circumstances under which such work can be done. It was really a pleasure to witness the activity and progress which the men made up through the principal thoroughfares a few days ago as we passed by them at work. It is to be hoped that no great bungle will occur to mar the satisfaction which the completion of so important works as waterworks in such a district ought to be.

**APPLICATION OF MOTIVE POWER.**—Some important discoveries have been made by Mr. GEORGE BEESLEY, C.E., of Kennington, to whom must be given the honour of showing that when used for locomotive purposes a wheel rotates upon its periphery, and that advantage is gained by setting the cranks dead fore and aft, or at 180° from each other. The impossibility, or otherwise, of encountering a dead point with the cranks so set has been supposed by some engineers to have been already ascertained, but the mistake probably arises from their having used the wrong kind of engine. Mr. Beesley's intention appears to be to run locomotives with two separate (perhaps two on each side of the boiler) single acting condensing engines "as the strokes of the two engines occur alternately." Amongst the advantages of the invention Mr. Beesley claims that by its use much lighter engines than those now employed will have sufficient adhesion to draw an equal load, so that he would seem capable of entirely superseding a previous suggestion for using putty around the driving wheel tyres for the same purpose. By way of appendix he gives a curious little treatise upon the application and resolution of force, which will certainly not subject him to the charge of plagiarism upon the writings of recognised mathematical authorities who have preceded him. Throughout the pamphlet there is evidence of freedom of thought seldom met with, so that it is well worth perusing.

**STEAM BOILERS.**—The invention of Mr. JAMES WALLACE, of Newcastle-on-Tyne, relates more particularly to high-pressure marine boilers, and consists of peculiar arrangements of the furnaces, tubes, and other internal parts of the boiler, whereby a complete circulation of the water is obtained, the main object of the invention being the prevention of unequal expansion and contraction of boilers, thus insuring greater durability and efficiency. In lieu of placing the furnaces and tubes equally, or nearly equally, on both sides of the boiler they are all set sufficiently to one side to give ample space for the water to return from the top to the bottom of the boiler, after rising to the surface from the furnaces and tubes. In combination with this arrangement he sometimes employs circulating plates, pipes, or suitable casting to improve the circulation, also one or more damper plates to check or regulate the motion of the water, such damper plates or plates being worked from the outside.

**MANUFACTURE OF PUDDLED IRON AND STEEL.**—The invention of Messrs. MITFORD and LESTER, of Darlington and Middlesbrough, consists in the addition to the iron under treatment of spiegelisen or other similar or analogous carbonising agent in a heated, granulated, or molten state, but by preference in a molten or nearly molten condition, in such proportions and at such times during the progress of manufacture as may be found desirable or necessary. The spiegelisen, or other similar or analogous carbonising agent, is introduced in a heated, granulated, molten, or nearly molten state into the puddling-furnace when the iron in the latter is in a fit state to receive it, which in most cases will be when the process of puddling is nearly completed, and in such proportions as may be necessary for the better refining and re-carbonising of the iron for either the hard or steely or more soft and ductile kinds of puddled steel or iron. In carrying their said invention into effect it will be understood that either rotary, mechanical, or other ordinary puddling-furnaces may be employed, and also that the spiegelisen or other similar analogous carbonising agent may be heated or melted in any convenient manner, but when the iron is melted in a separate furnace, such as a cupola, or air furnace, in connection with the process above described, the spiegelisen or other similar or analogous carbonising agent may be melted with the pig-iron and silicate of iron usually obtained from the sand bottoms of furnaces, such as those which are employed for heating purposes in rolling-mills and forges, and as a flux and refining agent, or it may be used in the molten iron as it is run from the blast-furnace. By means of the

above described method of treatment it will be found that the puddled steel or iron produced will be greatly improved in quality.

#### IN LIQUIDATION, AND ON THE ANGLO-AUSTRALIAN GOLD MINING COMPANY (LIMITED).

**NOTICE IS HEREBY GIVEN,** that a GENERAL MEETING of the shareholders in the above named company will be HELD on FRIDAY, the 20th day of July instant, at the offices of the company, No. 8, Austinfriars, in the City of London, at One o'clock in the afternoon precisely, for the purpose of passing the following special resolutions, or resolutions to the same effect:—

1.—That the Liquidator of the Anglo-Australian Gold Mining Company (Limited), in liquidation, be authorised to enter into an arrangement for the transfer of the whole of the property and assets of the company, of whatever nature or description, to a new company to be formed and registered under the Companies Acts, 1862 and 1867, with limited liability, having a nominal capital of £20,000, divided into 20,000 shares of £1 each, in consideration of the said new company paying to the Liquidator of this company a sum not exceeding £1600 to the debts and liabilities of this company, and the costs and expenses necessarily incurred in connection with the winding-up of this company, and also in consideration of the allotment of 5000 shares of £1 each fully paid up, and to the Liquidator of this company, such shares to be distributed pro rata amongst the shareholders in this company, such share to be issued to the allottee at a bonus share when and so soon as the full amount of £1 per share shall have been paid on such first mentioned 5000 cash shares, such last-mentioned shares to be offered in each instance to the shareholders in this company pro rata.

2.—That if any shareholder shall decline or neglect to declare his willingness to accept the share or shares paid on account of the transfer to the new company, which he may be entitled, for one month after notice shall have been sent him through the post at his registered address requiring him to make such election, such share or shares may be sold by the Liquidator for the best price which can be obtained for the same, and the amount realised by such sale carried to the credit of such shareholder.

3.—That any moneys arising from the sale of shares or otherwise which shall not be claimed for a period of six months from the date of the incorporation of the new company shall be paid over to the said new company, subject to such rights as may attach thereto.

4.—That the Liquidator shall have full power to continue the work at the said mine pending the carrying out and completing the above arrangements, and pay the costs occasioned thereby out of the funds of the company, the amount so paid to be repaid to the Liquidator by the new company.

5.—That the Liquidator have full power to vary and make such modification in the terms of the said transfer, execute all documents, and do all things which may find necessary or expedient to give full effect to the above arrangements.

By order, E. W. WINGROVE, Liquidator.

S, Austinfriars, London, 6th July, 1877.

#### 700,000,000 DOLLARS UNITED STATES GOVERNMENT FOUR PER CENT. FUNDED LOAN. IN BONDS ISSUED AND PAYABLE, PRINCIPAL AND INTEREST, IN THE UNITED STATES OF AMERICA.

These Bonds are issued in accordance with the provisions of an Act of Congress, entitled "An Act to authorise the refunding of the National Debt, approved July 14th, 1870, amended by an Act approved January 20th, 1871," and are redeemable at the pleasure of the United States after the 1st July, 1907, in coin of the standard value of the United States on said July 14th, 1870 (Gold Coin), with interest in such coin from the day of their date at the rate of 4 per cent. per annum, payable quarterly on the 1st January, 1st April, 1st July, and 1st October in each year.

The principal and interest are exempt from the payment of all taxes or duties of the United States, as well as from taxation in any form, by or under State, Municipal, or Local Authority.

These Bonds cannot be redeemed until 1907.

MESSRS. N. M. ROTHSCHILD AND SONS,  
" J. S. MORGAN AND CO.,  
" SELIGMAN BROTHERS,  
" MORTON, ROSE, AND CO.

Are prepared to RECEIVE SUBSCRIPTIONS, at the office, in New Court, St. Swithin's Lane, on account of the above \$700,000,000 FOUR PER CENT. BONDS.

Forms of application and particulars can be obtained at the office of the above-mentioned firms.

Subscription lists will be opened on Thursday, the 12th July, and will be closed on or before Wednesday, the 18th July.

The price of issue is £102 3s. for every \$500 bond, payable as follows:—

£ 5 0 0	on application.
20 0 0	all otment.
25 0 0	30th Augu-t.
25 0 0	17th Octo-ber.
27 15 0	17th December.

£102 15 0

Scrip will be issued. Interest at the rate of 4 per cent. per annum will be allowed on the instalments from their due dates to the 31st December, 1877, and a coupon for the amount, payable the 1st of January, 1878, will be attached to the scrip. The interest on the first instalment will date from the 25th instant. The Bonds of the Funded Loan are issued in the United States, and will be delivered in London, in exchange for scrip, after payment of the last instalment, with coupons attached, payable quarterly, the first of which will be due 1st April, 1878.

Applications for these bonds must be made in the accompanying form. In case the allotment should not require the whole deposit the surplus will be returned; and if the deposit be insufficient for the first instalment on the amount allotted, the balance required must be paid forthwith.

In case of no allotment being made the deposit of the applicant will be returned.

The failure to pay the whole of the instalments subjects all previous payments to forfeiture.

Subscribers may pay up the remaining instalments under discount at rates to be fixed hereafter.

The bonds may, at the option of the holder, be inscribed, and United States Treasury Cheques for dividends thereon, will be sent from Washington to the registered address of the holder in any part of Europe, on the principle adopted by the Bank of England in paying interests on Consols. An officer of the United States Treasury will remain for some time in London, to inscribe, free of charge, the bonds into the names of such holders as may desire it.

The bonds, to bearer, with coupons attached, are in denominations of \$50, \$100, \$500, \$1000, and if required, \$5000. The registered bonds are in like amounts, with the additional denominations of \$10,000, \$20,000, and \$50,000.

London, New Court, St. Swithin's-lane, 12th July, 1877.

No. ....

700,000,000 DOLLARS UNITED STATES GOVERNMENT

FOUR PER CENT. FUNDED LOAN.

To Messrs. ....

GENTLEMEN, — request that you will allot to ..... dollars ..... say ..... dollars nominal capital of the above stock, on which ..... enclose the required deposit of £5 per \$500 dollars, or £ ..... and ..... agree to accept that amount, or any less sum that may be allotted to ..... and to pay the balance due, according to the conditions of your prospectus of the 12th July, 1877.

Gentlemen, your obedient servant  
Name in full length.....  
Address in full.....  
Dated this .....

WILLIAM FRANCIS, M. and C.E., 2, DERWEN VILLAS,  
MOLD. Over Twenty-five years' experience. Pupils received for a  
Course of Instruction in Surveying, Dailing, Levelling, Geology and Mineralogy,  
their practical application to the various branches of Metalliferous Mining,  
Quarrying, &c. Terms on application.

JULY 14 1877.]

## THE MINING JOURNAL

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## BRISTOL MINING SCHOOL.

(ESTABLISHED 1856.)

THE NEXT SESSION BEGINS ON MONDAY, SEPT. 9, 1877.—  
The SCHOOL OFFERS a COMPLETE COURSE of INSTRUCTION in MINING and ENGINEERING, and the work will be found an effective preparation for the Mine Manager's Certificate. The LABORATORY is open to those who wish to study PRACTICAL CHEMISTRY, ANALYSIS, or ASSAYING, though not Members of the School. There is also in the same Institution a SCHOOL of APPLIED SCIENCE for BOYS, which prepares for the work of the Mining School and Laboratory. Prospects and any further particulars can be obtained at the Treasurer's Office, Merchants' Hall, Bristol, where pupils are entered and fees received, and where also information can be had concerning lodgings.

## BRISTOL MINING SCHOOL.

(ESTABLISHED 1856.)

UNDER THE DIRECTION OF THE GOVERNORS OF THE COLSTON SCHOOLS TRUST.

THE NEXT SESSION BEGINS ON 9TH SEPTEMBER, 1877.—  
The FULL COURSE of INSTRUCTION extends over a PERIOD of TWO YEARS, but Students are received who may wish to terminate their Studies at the end of their First Session. The work of the School will be found an effective preparation for the Mine Manager's Certificate. One day per week is spent in the Field or Mine, and considerable time is devoted to the Plotting of Surveys and the Drawing and Study of Mine Machinery. The LABORATORY is also OPEN DAILY as a SCHOOL of CHEMISTRY for the instruction of the general public in the Theory and Practice of Chemical Analysis and Assaying. There is also in the same Institution a SCHOOL of APPLIED SCIENCE for BOYS, which affords a suitable preparation for the Mining School or Laboratory. Prospects and any further particulars can be obtained at the Treasurer's Office, Merchants' Hall, Bristol, where pupils are entered and fees received, and where information may be had concerning lodgings.

W. F. LOWE, F.C.S.,  
Associate of the Royal School of Mines,  
ASSAYER AND ANALYTICAL CHEMIST

ASSAYS AND ANALYSES MADE OF ORES, FIRE-CLAYS,  
LIMESTONES, &c.

ADDRESS, — ASSAY OFFICE, CHESTER.

EMMENS AND CO. (LIMITED),  
MINING ENGINEERS AND MANUFACTURING CHEMISTS.

CHIEF OFFICE,  
134, PALMERSTON BUILDINGS, BISHOPSGATE STREET, LONDON, E.C.

PRINCIPAL WORKS,  
REDMOOR, KELLY BRAY, AND WHEAL EDWARD, CORNWALL.  
The management of Mines and Chemical Works and the London Agencies of Provincial and Foreign Manufacturers and Commercial Firms undertaken.

Technical Reports and Surveys of every kind made.

MANAGING DIRECTOR—DR. STEPHEN H. EMMENS.

## ADVERTISING.

C. H. MAY AND CO.,  
GENERAL ADVERTISING OFFICES,  
78, GRACECHURCH STREET, LONDON, E.C.  
ESTABLISHED 1846.

ADVERTISEMENTS received for insertion in all NEWSPAPERS, &c.

THE BIRMINGHAM WAGON COMPANY  
(LIMITED)

MANUFACTURE RAILWAY CARRIAGES AND WAGONS of EVERY DESCRIPTION, for HIRE and SALE, by immediate or deferred payments. They are also wagons for hire capable of carrying 6, 8, and 10 tons, part of which are constructed specially for shipping purposes. Wagons in working order maintained by contract. MANUFACTURERS also of IRONWORK, WHEELS, &c., EDMUND FOWLER, Managing Director.

WAGON WORKS, — SMETHWICK, BIRMINGHAM.

GLASGOW AND THE HIGHLANDS.

ROYAL ROUTE VIA CRINAN AND CALEDONIAN CANALS, by ROYAL MAIL STEAMER, "IONA," DAILY, at Seven A.M., and from GREENOCK, at Nine A.M.

See bill with map and tourist fares, free, at MESSRS. CHATTO AND WINDUS, Publishers, 74, Piccadilly, London; or by post from DAVID HUTCHESON and Co., 12, Hope street, Glasgow.

IN THE PARISH OF GWENNAP, CORNWALL.

Capital £10,000, in 5000 Shares of £2 each.

10s. per share on application, and 10s. per share on allotment.

Where no allotment can be made, the deposit will be returned in full.

No call for six months: probably none further will be required.

Directors to be chosen by the Shareholders at first meeting.

BANKERS.

MESSRS. GLYN, MILLS, and CO., London.

MESSRS. TWEEDY, WILLIAMS, and CO., Redruth, Cornwall.

MANAGER.

MR. CHAS. BAWDEN, Poldice House, St. Day, Scorrier, Cornwall.

This company is formed for the purpose of working a piece of mining ground in the parish of Gwennap, the property of His Grace the Duke of Buckingham and Chandos, Trelawny, Esq., granted for a term of 21 years, at a royalty of 1-18th due. It is situated in the immediate proximity of mines of established value for copper at the north foot of the well-known granite range of Carn Marth, surrounded by mines that have been immensely productive and profitable. It is virgin or unexplored ground, in a line of the lodes of the Carn Brea district from the west, and the lodes of Gwennap from the east, of which well-known district this ground forms a part.

The Carn Marth grant is about 500 fathoms from east to west on the course of the lodes, and 300 fathoms in width, affording scope for opening out a deep and extensive mine. The lodes of Great Consols, Wheal Jewell, and Wheal Damsel are within its limits. The profits from those mines alone exceeded over £200,000 sterling; the back (surface outcrop) of one has been opened about the centre of the grant, and a shaft sunk on it 15 fathoms, which proves to be 6 feet wide, composed of a true copper gossan, in character the same as found on the top of the great copper deposits of the county; it is also intersected by cross-courses, to which is not a little to be attributed the immense accumulations of copper ore met with in the surrounding mines, and which continued for 40 years to pay very large dividends. Moreover, an evan course of corresponding crystalline character to those in connection with the great body of ore found in the Great Consols, Wheal Jewell, and Wheal Damsel accompanies the Carn Marth lodes. It is, therefore, to be confidently relied on that comparatively little depth of development is required to ensure the realisation of a copper mine of very great value in Carn Marth.

It is intended to have a 40-in. diameter cylinder steam-engine for this mine, to ensure its fully effective development—say, in the first place to a depth of 50 fms., at which several of the greatest mines of Gwennap commenced being ore-producing, proving more and more productive in depth, and paying larger profits than any mines in the other districts of Cornwall. The copper mines of this district have realised altogether such astounding profits as have gained for them a wide world celebrity, many of the leading Cornish families being indebted to them for their influential position and wealth. It is only intended by the amount of capital nominated to fix the maximum liability of shareholders, not meaning it to be understood that anything like so much will be required, to open out and establish the mine on a permanently good dividend-paying mine, which is confidently to be relied on, will not necessitate a larger expenditure than £5000, paying for all engine power, mechanical means and appliances, and, indeed, everything required, thus giving a rich prize for comparatively little money.

The shareholders will have the full benefit of the capital subscribed, there being no claim for promotion money or free shares, the object is to offer and open out a good mine on the principle of equitably advantageous co-operation, the cost of lease and out-of-pocket expenses consequent on its acquirement being, of course, charged to the company. One moiety of the capital will be privately subscribed, leaving 2500 shares to be issued, which will be allotted according to priority of application.

Shares to be applied for by letter, remitting the first payment of 10s. per share, either to the manager or bankers of the company.

MESSRS. THORNYCROFT AND CO.  
FINANCIAL AGENTS AND SHARE BROKERS,  
61, SOUTH JOHN STREET, LIVERPOOL.

MR. R. TREDDINNICK, DEALER in STOCKS and SHARES,  
has special business and special information as to the true position and  
value of the following Mine Shares:—  
Great Laxey,  
Lead Hill,  
Tarkerville,  
Penistreath,  
Dylife,  
Van Consols,  
Devon Great Consols,  
Llanwrst,  
Cathedral,  
R. TREDDINNICK, "EXCHANGE," 66, COLEMAN STREET, E.C.

## In the Court of the Vice-Warden of the Stannaries.

Stannaries of Cornwall.

**I**N the MATTER of the COMPANIES ACTS, 1862 and 1867, and of the NEW CHIVERTON MINING COMPANY (LIMITED), —TO BE SOLD, under the direction of the Registrar of the said Court, on Thursday, the 26th day of July instant, at Eleven o'clock in the forenoon, at the NEW CHIVERTON MINE, in the parish of Perranzabuloe, within the said Stannaries, in One or more Lots (subject to such conditions as shall be then and there stated and produced), all that the INTEREST of the said company of and in the SETTS under which its mining operations have been carried on, together with the WHOLE of the MINING PLANT, MACHINERY, MATERIALS, AND EFFECTS, Belonging to the said company, and being within and upon the said Mine, and comprising:—

ONE 40 in. CYLINDER PUMPING ENGINE, with ONE BOILER, 10 tons.  
ONE 4 horse power ENGINE and BOILER, with crusher attached.

Large shears and two shives; 8 in. capstan; capstan rope; 2 1/2 in. and 1 1/2 in. iron rods; 120 fms. iron staves; 11 in. main rods; rod plates and bolts; 2 1/2 in. and 1 1/2 in. iron rods; 120 fms. iron staves; 5 in. pole and lift for condensing water; two horse whisks; shaft tackle and shives; several whisks and other kibbles; winch; large quantity of launders; railroad and stands; dressing floors; two jiggling machines and hatches; frames and kives; several wood houses; quantity of chains; wire and hemp ropes; smiths' bellows; vices, anvils, jacks, and tools; smith and miners' tools; grindstone; screwstock; taps and plates; beams, scales, and weights; a quantity of new and old iron; powder; candles; brass; new and old timber; miners' dial; account house furniture; and a quantity of other materials and effects in general use in mines.

To inspect the above, apply to the Bailiff in charge at the mine; and for further particulars to Mr. CHARLES WILLIAM CLINTON, the Official Liquidator of the said company, at the Stannaries Court Office, Truro.

HODGE, TROKIN, AND MARRACK, TRURO.  
(Solicitors for the said Official Liquidator.)

Dated Stannaries Court Office, Truro, July 11th, 1877.

KING ARTHUR SILVER-LEAD MINE,

TINTAGEL CASTLE, near CAMEL福德, NORTH CORNWALL.

**V**ALUABLE PLANT AND MACHINERY FOR SALE.  
MESSRS. EVELYN AND SON WILL SELL, BY PUBLIC AUCTION, on the MINE, at the Castle Tintagel, on Monday, July 16th, at Two o'clock in the afternoon, the undermentioned

MACHINERY AND PLANT, viz.:—

ONE 30 horse power TURBINE WHEEL with drawing and pumping machinery, complete, nearly new.

ONE 10 horse power portable STEAM ENGINE; Allen's double expansive patent cylinder, with gear for pumping attached; one balance bob, with sky rod; poppet heads, with pulley wheels; 3 1/2 in. chain, 140 ft.; one whm kibble, nearly new; about 19 fms. of 8 in. pumps; working box and windbore, complete; three shaft ladders; one chain ditto; timber in shaft; capital large cranes, winch and frame; slate cistern, 90 gallons; set of patent pulley blocks to carry 4 tons; windlass and two kibbles; two large oak doors and frame; about 70 fms. 10 in. pumps and bends for supply of turbine, nearly new; two timber bridges; 200 fms. of glazed earthenware pipes; large 8 in. warp rope; 9 ft. 8 in. windbore; jiggling machine, complete, &c.

SMITHS' SHOP.—32 in. bellows, anvil, vise, iron horse, grinding stone and frame, iron screw jack, sundry other smiths' tools, all nearly new; old and new iron, with sundry other tools usual in mines.

Also a large American kitchen stove, with cooking utensils, complete; large deal table, eight chairs, &c.

The whole of the machinery will be found to be in good condition, being nearly new, and can be shipped on the spot.

Dated Government and General Emigration Offices, Camelot, July 2nd, 1877.

BY ORDER OF THE MORTGAGEES—DURHAM.

**I**MPORTANT SALE OF THE COLLIERIES OF THE ORIGINAL HARTLEPOOL COLLIERIES COMPANY (LIMITED). IN LIQUIDATION.

**M**RS. CHARLES BROUH WILL SELL, BY AUCTION, at the Turk's Head Hotel, Grey-street, Newcastle upon Tyne, on Thursday, August 9th, at One o'clock precisely, in Two Lots, the IMPORTANT and WELL-KNOWN CURRENT GOING SEA-SALT COLLIERIES, in the county of Durham, called WHEATLEY HILL, THORNLEY, and LUDWORTH, containing with their associated COAL FIELDS 3370 acres of theirents, together with COLLIERY PLANT OF PITS, ENGINE HOUSES, ENGINES, BOILERS, MACHINERY, RAILWAYS, COKE-OVENs, BRICK-ARs, and GASWORKS, AGENTS' and WORKMEN'S HOUSES, COTTAGES, WORKSHOPS, STABLES, and other erections and buildings.

Particulars with plan and conditions of sale may be had gratis, in London, of MESSRS. WOODGROVE AND SON, Solicitors, 15, Holborn Viaduct, Cavendish-square, W.; MESSRS. DAVIDSON AND CO., 70, Basinghall-street, E.C.; MESSRS. BELL, BRODRICK, and GRAY, 4, Bow Churchyard, E.C.; and R. SMITH, Esq., Official Liquidator, 4, New Broad-street, E.C., and in Gateshead-on-Tyne, of J. W. SWINBURNE, Esq., Town Hall; and in Newcastle-on-Tyne, of the Auctioneer, Blackett-street.

The collieries may be viewed on application to PHILIP COOPER, Esq., at the Thornley Colliery. Postal address—Thornley Colliery, Ferry Hill, Durham.

THE TOLGUS CONSOLS (LIMITED).

**T**HE DIRECTORS of this COMPANY will RECEIVE TENDERS for the SUPPLY of the following MACHINERY, which may be either NEW or SECONDHAND, but must be subject to the approval of the Manager and Engineer of the Mines:—

ONE 90 in. CYLINDER PUMPING ENGINE, with TWO BOILERS, not less than 10 tons each.

ONE WINDING ENGINE, of not less than 24 in. cylinder, with ONE BOILER, 10 tons, and winding gear.

ONE STEAM CAPSTAN, adapted for steel rope.  
70 fms. of 15 in. PUMPS.

TWO 15 in. PLUNGER POLES, with cases and bottoms, complete.  
The tenders must be sent to the offices of the company, 30, Great St. Helen's, London, E.C., addressed to the Secretary, E. J. BARTLETT, Esq., on or before the 20th August next.

Particulars of the engines, &c., should be stated, together with terms of payment.

The directors do not bind themselves to accept the lowest or any tender.

30, Great St. Helen's, London, E.C.

SLATE QUARRY, NORTH WALES.

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JAMES M'CALL, at the Mine, will show the underground workings, as also the plans and sections; and for further particulars application may be made to ALEXANDER M'CUBBIN, Solicitor, Ayr; or to Mr. THOMAS SMITH, Land Steward, Berborth Mains, Dalmellington, Ayrshire.

Ayr, 18th June, 1877.

HEMATITE IRON ORE ROYALTY.

AT MOOR ROW, BIGRIGG MOOR, NEAR WHITEHAVEN.

**T**OB E LET, BY TENDER, for a term of years, to commence from the 1st September, 1877.—

The IRON ORE under SEVENTY-FIVE ACRES of LAND at MOOR ROW, in the parishes of Cleator and Egremont, in the county of Cumberland, in the occupation of Mr. John Postlethwaite, of the Hollins, Whitehaven.

This Royalty is situated in the centre of the Bigrigg District, is bounded on the north-west and south by mines of Messrs. Lindow, and on or towards the east by mines of Messrs. Ainsworth and Co. and Messrs. Burneyton, Brown, and others, and in its immediate neighbourhood are other well-known mines worked by Lord Leconfield, Messrs. Lindow, John Stirling, Esq., and the Cleator Iron Ore Company, which latter company are sinking a pit adjoining a portion of the eastern boundary of the estate.

The royalty has been actively worked during the last twenty years, and large quantities of ore have been raised from shallow workings, extending over an area of about twenty acres. The present working shaft is in good condition, and is supplied with adequate engine power, and all necessary machinery and plant. It is connected with the Cleator and Egremont Railway by a branch line, and the metal can be tipped into wagons direct from the shaft.

The ore of the Bigrigg District is remarkable for its purity and high metallic yield, and commands the highest price.

Tenders must be endorsed "Tender for Moor Row Royalty," and will be received by Mr. BROWN, Solicitor, 12, Scotch street, Whitehaven, up to the 20th August, immediately after which date the taker will be declared. The lessors do not, however, bind themselves to accept the highest or any tender.

After the 18th June, conditions of letting may be had, and plans showing the royalty, underground workings, and adjoining mines, may be seen on application to Mr. GEORGE GREY, M.E., New Lowther-street, Whitehaven; or to Mr. BROWN, 12, Scotch-street, Whitehaven.—7th June, 1877.

HEMATITE IRON ORE ROYALTY.

AT MOOR ROW, BIGRIGG MOOR, NEAR WHITEHAVEN.

**T**OB E LET, BY TENDER, for a term of years, to commence from the 1st September, 1877.—

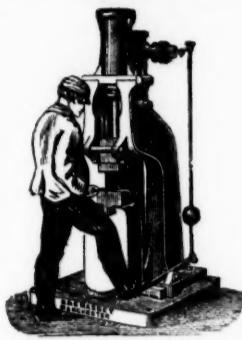
The IRON ORE under SEVENTY-FIVE ACRES of LAND at MOOR ROW, in

# B. & S. MASSEY, OPENSHAW, MANCHESTER.

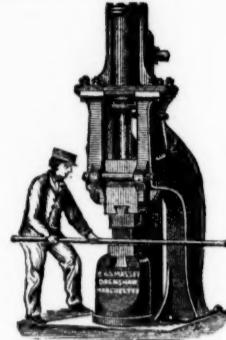
Prize Medals—Paris, 1867; Havre, 1868; Highland Society, 1870; Liverpool, 1871; Moscow, 1872; Vienna, 1873; Scientific Industry Society, 1875; Leeds, 1875; Paris, 1875; Manchester and Liverpool Society, 1876; U.S. Centennial, Philadelphia, 1876.

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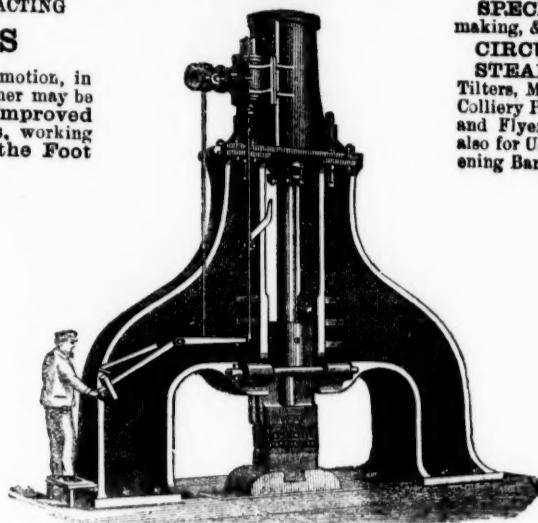
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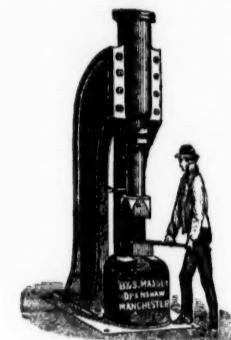
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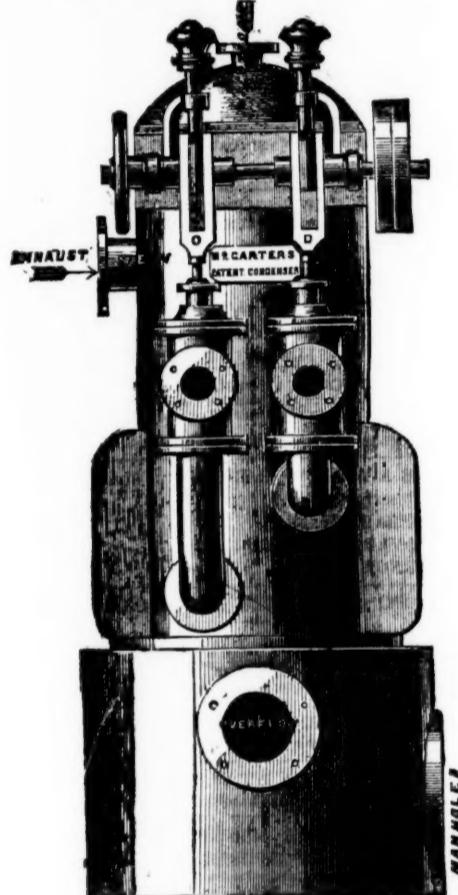


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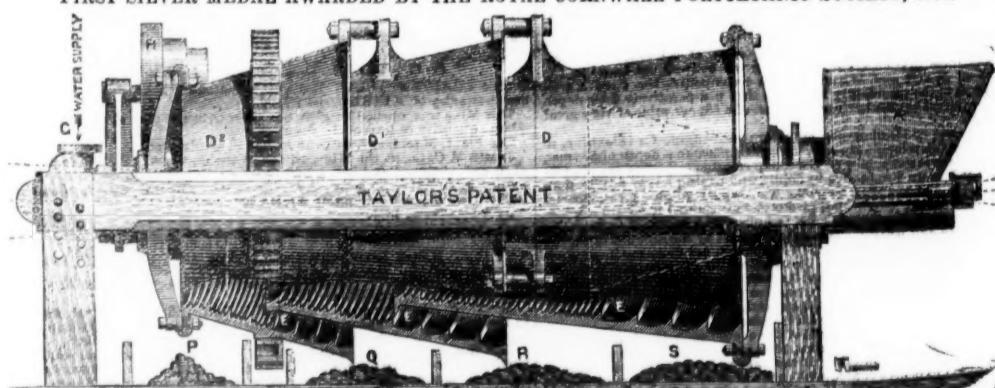
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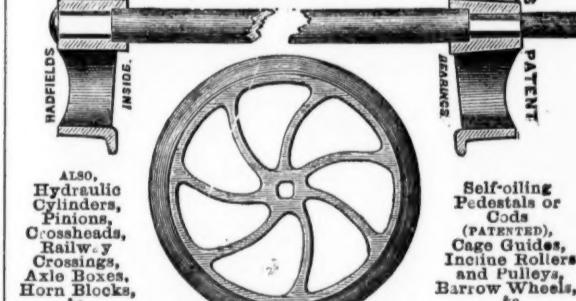
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15000 Balmynheer, t, Wendoron (4000 to ls.)	10 0 0	—	—	—	0 2 0	0 2 0	Nov. 1876
30000 Barnsbyde, c, m.s., Devon*	1 0 0	—	1 1/2	134 15%	0 2 0	0 2 0	June 1876
20000 Benthallack, t, c, St. Just*	119 5 0	25	20	25	619 15	5 0	Aug. 1872
4000 Brookwood, c, Buckfastleigh	1 10 0	—	1 1/2	134 15%	3 16 0	0 2 0	Nov. 1875
2000 Burn Alyn, t, Denbigh. (10. sh.)	6 0 0	—	7 1/2	7 1/2	0 7 0	0 7 0	Jan. 1877
8848 Cargill, s.t., Newlyn	6 0 0	—	4	3 1/2 4	4 16 8.	12 6	Oct. 1872
6400 Cashiwell, t, Cumberland*	2 10 0	—	2 1/2	2 1/2	1 9 6	0 2 0	Aug. 1876
1000 Carr, Brea, c, t, Illogan's	26 7 8	30	28 30	308 0	0 1 0	0 1 0	Feb. 1874
2450 Cook's Kitchen, t, Illogan's	23 9 9	—	1 1/2	1 1/2	11 17 0	0 7 6	Jan. 1875
10240 Devon Gt. Consols, c, Tavistock*	1 0 0	—	4 1/2	4 1/2	116 15	0 5 0	May 1877
4294 Dolcoath, t, c, Camborne	10 14 10	30	28 30	111 11 1	0 5 0	0 5 0	July 1877
8000 East Black Craig, t, Scotland	5 0 0	—	—	—	0 10 0	0 10 0	Feb. 1877
8244 East Darren, t, Cardiganshire	2 16 8	—	1	2 1/2	14 19 0	0 2 0	Oct. 1872
6 000 East Darren, t, Cardiganshire	32 0 0	—	235 10 0	1	0 0 0	Aug. 1876	
6 000 East Pool, t, c, Illogan	0 9 9	10	9 10	15 2 3	0 2 0	2 0 0	June 1877
4000 Foxdale, t, Isle of Man*	25 0 0	—	82 5 0	0 10 0	F. B.	1876	
15000 Glasgow Carr, c, t [30,000 £1 p., 10,000 15s. p.]	1 1/2	1 1/2	0 12 10	0 6 0	Mar. 1876		
15000 Great Dyllyne, t, Montgomeryshire	4 0 0	—	4	3 4	0 2 6	0 2 6	Apr. 1876
15000 Great Laxey, t, Isle of Man*	4 0 0	—	21	20 21	2 3 0	0 10 0	July 1877
618 Great Pendle, t, b, Perranzabuloe	5 18 8	—	—	—	0 1 6	0 1 6	May 1876
28000 Great West Van, t, Cardiganshire	2 0 0	—	3 1/2	3 1/2	0 2 0	0 2 0	Aug. 1876
6400 Green Hurth, t, Durham	0 8 0	—	2 1/2	2 1/2	1 15 0	0 3 0	Aug. 1876
20000 Grogwinion, t, Cardigan	2 0 0	—	4	3	0 12 0	0 4 0	Feb. 1877
9830 Gunnislake (Clitters), t, c	5 8 0	—	2 1/2	2 1/2	0 13 9	0 1 0	Oct. 1876
1024 Berdoffoot, t, near Liskeard*	8 10 0	—	4	3	62 5 0	0 15 0	Oct. 1876
18000 Hington Down, c, Calstock*	0 4 0	—	—	—	0 1 0	0 1 0	Nov. 1875
6000 Holm bush, a, t, Callington*	1 0 0	—	1 1/2	1 1/2	0 1 6	0 0 6	April 1878
25000 Kilnabey, t, Tipperary	1 0 0	—	—	—	0 1 0	0 1 0	Nov. 1875
20000 Leadhills, t, Lanarkshire	6 0 0	—	6 1/2	6 1/2	0 6 0	0 6 0	April 1878
4000 Llisourne, t, Cardiganshire	18 15 0	80	75 80	781 10 0	1	0 0 0	May 1877
14000 Llanidloes, t, Montgomery	3 0 0	3	2 3	0 9 0	0 4 0	Nov. 1876	
6120 Lovell, t, Wendoron	0 18 0	—	—	—	0 17 6	0 1 0	Jan. 1874
9000 Mark Valley, c, Linkinhorne	5 0 8	—	1 1/2	1 1/2	7 15 0	0 2 0	Jan. 1876
20000 Minera Mining Co., t, Wrexham*	5 0 0	9	8 9	67 0	0 2 0	0 4 0	May 1877
444 North Busy, c, Chacewater	3 9 8	—	—	—	23 11 6	0 3 6	Jan. 1878
2000 North Hendale, t, Wales	2 10 0	—	—	—	1 10 0	1 0 0	June 1877
27855 Old Treburret, t, St. Just*	12 2 0	—	—	—	4 13 0	0 12 0	Sept. 1878
6000 Old Treburret, t, (10 per cent. pref.)	0 10 0	—	3 1/2	3 1/2	0 1 0	0 0 0	Feb. 1878
5000 Pend-an-drean Con., t, Redruth	0 8 5	—	7 1/2	7 1/2	0 9 0	0 9 0	June 1876
5000 Penhalls, t, St. Aspre	3 0 0	—	2 1/2	2 1/2	3 13 6	0 2 0	July 1876
6000 Penrann, t, bar, North Wales*	5 0 0	—	5 1/2	5 1/2	0 5 0	0 5 0	Mar. 1877
51800 Penstrefall, t, c, Gwennap	2 0 0	—	3 1/2	3 1/2	0 2 8	0 0 8	Nov. 1875
12000 Phoenix, & W. Phoenix, t, Link. §	3 4 9	—	4 1/2	4 1/2	2 9 6	0 4 0	May 1877
18000 Prince Patrick, t, Holywell	1 0 0	—	2 1/2	2 1/2	0 14 0	0 1 0	Jan. 1877
400 Providence, t, Lelant*	21 6 7	—	—	—	104 12 6	0 10 0	Sept. 1877
12000 Roman Gravels, t, Silop*	7 10 0	10	8 10 0	84 94	7 10 0	0 8 6	May 1877
512 South Cardon, t, c, Cleer	1 5 0	120	110 120	738 10 0	2	0 0 0	July 1877
6128 South Condurrow, t, c, Camborne*	8 5 8	—	8	7 8 8	2 12 0	0 6 0	July 1877
12000 St. Harmon, t, Montgomery	3 0 0	—	3 1/2	3 1/2	0 3 0	0 3 0	July 1877
10000 St. Fr. Patrick, t, (8000 sh. issued)	1 0 0	—	—	—	0 7 0	0 1 0	Oct. 1877
12000 Tawkerne, t, Salop*	6 0 0	—	7 1/2	7 1/2	4 17 0	0 5 0	June 1877
6000 Tincroft, t, P. Illogan	9 0 0	—	15	13 15	50 8 4	0 5 0	Dec. 1878
15000 Van, t, Llanidloes*	4 5 0	—	38	34 36	21 11 6	0 18 0	May 1877
8000 W. Chiverton, t, Perranzabuloe*	12 10 0	16	14 16	55 0 0	0 10 0	0 10 0	Jan. 1877
1783 West Polide, St. Day	10 0 0	—	13	11 13	0 19 0	0 4 0	July 1877
612 West Tolgus, t, Redruth	95 10 0	62 1/2	61 63	20 15 0	1 0 0	0 1 0	June 1877
2042 West Wheal Frances, t, Illogan	28 1 3	3	2 1/2	2 1/2	8 12 6	0 5 0	June 1877
512 West Wheal Frances, t, Illogan*	3 0 0	—	4 1/2	4 1/2	0 5 0	0 0 6	Oct. 1877
12000 West Whey Valley, t, Montgomery	3 0 0	—	4 1/2	4 1/2	0 6 0	0 0 6	Oct. 1877
2042 Wheal Basset, t, Illogan*	21 2 6	—	—	—	63 10 0	1 10 0	Nov. 1878
2042 Wheal Jane, t, Kew	2 13 10	—	13 0 0	1 0 0	0 1 0	0 0 0	May 1877
4298 Wheal Kitty, t, St. Aspre	5 4 6	2	1 1/2	2 1/2	11 19 6	0 2 6	June 1877
25000 Wh. Newton, a, c, t, Harrowbarrow*	1 0 0	4	3 4	0 2 6	0 0 6	0 0 6	April 1874
8000 Wheal Owles, t, St. Just	86 5 0	80	75 80	523 10 0	4	0 0 0	Aug. 1875
8000 Wheal Prussia, t, Redruth	2 0 0	—	4 1/2	4 1/2	0 4 0	0 1 0	July 1877
25000 Wicklow, c, s.t., Wicklow	2 10 0	—	—	—	52 9 0	0 2 0	Mar. 1874
10000 Wye Valley, t, Montgomery*	3 0 0	—	4 1/2	4 1/2	0 10 6	0 4 6	Oct. 1876

## FOREIGN DIVIDEND MINES.

Shares.	Mines.	Paid.	Last pr.	Clos. pr.	Last Cull.
25500 Alamillos, t, Spain*	2 0 0	—	2	1 1/2 2	1 17 3
30000 Almada and Trito Consol., s.t.*	1 0 0	—	3 1/2	3 1/2	0 6 3
20000 Australian, c, South Australia*	7 1 6	—	2 1/2	2 1/2	0 10 0
10000 Battle Mountain, t, (6240 part pd.)	8 0 0	—	—	—	0 10 0
15000 Bird-eye Creek, g, California*	4 0 0	—	3 1/2	3 1/2	0 10 0
12320 Burra Burra, c, So. Australia	5 0 0	—	—	—	0 10 0
20000 Cape Copper Mining, t, So. Africa*	7 0 0	—	3 1/2	3 1/2	0 10 0
40000 Cedar Creek, g, California*	5 0 0	—	3 1/2	3 1/2	0 5 0
15000 Chicago, s, Utah*	10 0 0	—	2 1/2	2 1/2	0 13 6
55000 Colorado United, s.t., Colorado*	8 0 0	—	2 1/2	2 1/2	0 5 0
10000 Copiapo, c, Chile, (10 sh. shares)	16 15 0	—	2 1/2	2 1/2	7 11 5
10000 Don Pedro North del Rey*	0 16 0	—	3 1/2	3 1/2	0 3 0
23500 Eberhardt and Aurora, s, Nevada*	10 0 0	—	3 1/2	3 1/2	2 2 9
7000 English and Australian, c, t, S. Aust.	2 10 0	—	1 1/2	1 1/2	1 8 0
8000 Flagstaff, s, Utah*	10 0 0	—	3 1/2	3 1/2	0 3 0
25000 Fortuna, t, Spain*	2 0 0	—	3 1/2	3 1/2	0 2 0
55000 Fronfert & Boliv, g, New Gran*	2 0 0	—	3 1/2	3 1/2	0 1 0
8000 Gold Run, hyd.	1 0 0	—	3 1/2	3 1/2	0 1 0
65000 Kapunda Mining Co. Australiat	1 2 0	—	3 1/2	3 1/2	0 2 4
20000 Last Chance, t, Utah	5 0 0	—	3 1/2	3 1/2	0 6 0
15000 Linares, t, Spain*	3 0 0	—	3 1/2	3 1/	